

**FINAL
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SERVO CORPORATION
HICKSVILLE, NASSAU, NEW YORK**

Volume 2 of 2

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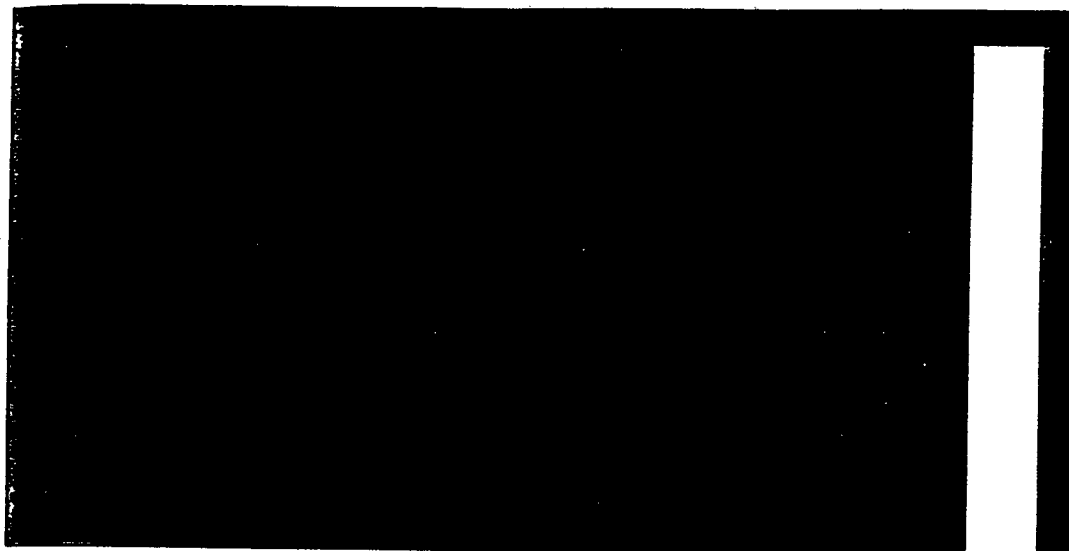
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Prepared by:

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REFERENCE NO. 13



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GROUNDWATER

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Table 2.2 Range of Values of Hydraulic Conductivity and Permeability

	Rocks	Unconsolidated deposits	k (darcy)	k (cm ²)	K (cm/s)	K (m/s)	K (gal/day/ft ²)
			10 ⁵	10 ⁻³	10 ²	1	
			10 ⁴	10 ⁻⁴	10	10 ⁻¹	10 ⁶
			10 ³	10 ⁻⁵	1	10 ⁻²	10 ⁵
			10 ²	10 ⁻⁶	10 ⁻¹	10 ⁻³	10 ⁴
			10	10 ⁻⁷	10 ⁻²	10 ⁻⁴	10 ³
			1	10 ⁻⁸	10 ⁻³	10 ⁻⁵	10 ²
			10 ⁻¹	10 ⁻⁹	10 ⁻⁴	10 ⁻⁶	10
			10 ⁻²	10 ⁻¹⁰	10 ⁻⁵	10 ⁻⁷	1
			10 ⁻³	10 ⁻¹¹	10 ⁻⁶	10 ⁻⁸	10 ⁻¹
			10 ⁻⁴	10 ⁻¹²	10 ⁻⁷	10 ⁻⁹	10 ⁻²
			10 ⁻⁵	10 ⁻¹³	10 ⁻⁸	10 ⁻¹⁰	10 ⁻³
			10 ⁻⁶	10 ⁻¹⁴	10 ⁻⁹	10 ⁻¹¹	10 ⁻⁴
			10 ⁻⁷	10 ⁻¹⁵	10 ⁻¹⁰	10 ⁻¹²	10 ⁻⁵
			10 ⁻⁸	10 ⁻¹⁶	10 ⁻¹¹	10 ⁻¹³	10 ⁻⁶
							10 ⁻⁷

Table 2.3 Conversion Factors for Permeability and Hydraulic Conductivity Units

	Permeability, k^*			Hydraulic conductivity, K		
	cm ²	ft ²	darcy	m/s	ft/s	U.S. gal/day/ft ²
cm ²	1	1.08×10^{-3}	1.01×10^8	9.80×10^2	3.22×10^3	1.85×10^9
ft ²	9.29×10^2	1	9.42×10^{10}	9.11×10^3	2.99×10^6	1.71×10^{12}
darcy	9.87×10^{-9}	1.06×10^{-11}	1	9.66×10^{-6}	3.17×10^{-3}	1.82×10^1
m/s	1.02×10^{-3}	1.10×10^{-6}	1.04×10^5	1	3.28	2.12×10^6
ft/s	3.11×10^{-4}	3.35×10^{-7}	3.15×10^4	3.05×10^{-1}	1	6.46×10^5
U.S. gal/day/ft ²	5.42×10^{-10}	5.83×10^{-13}	5.49×10^{-2}	4.72×10^{-7}	1.55×10^{-6}	1

*To obtain k in ft², multiply k in cm² by 1.08×10^{-3} .

LONG ISLAND WATER RESOURCES

BULLETIN 13

HYDROLOGIC AND WATER-QUALITY APPRAISAL OF
SOUTHEAST NASSAU COUNTY
LONG ISLAND, NEW YORK



**LONG ISLAND WATER RESOURCES
BULLETIN 13**

**HYDROLOGIC AND WATER-QUALITY APPRAISAL OF
SOUTHEAST NASSAU COUNTY,
LONG ISLAND, NEW YORK**

**By
Henry F. H. Ku and Dennis J. Sulam**

**U.S. Department of the Interior
Geological Survey**

**Prepared by the
U.S. GEOLOGICAL SURVEY**

**in cooperation with the
NASSAU COUNTY DEPARTMENT OF PUBLIC WORKS**

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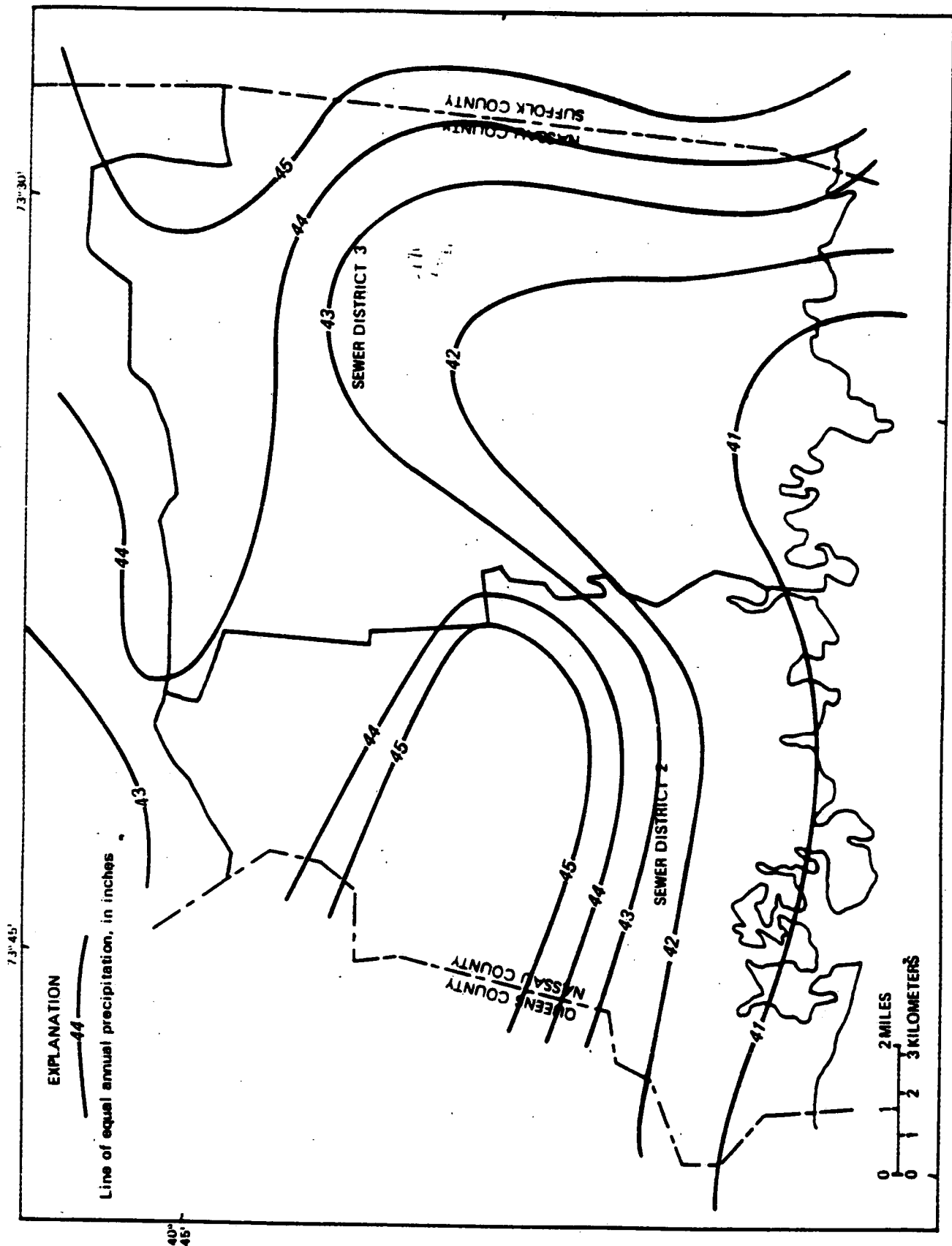


Figure 7.--Mean annual precipitation in Nassau County, 1951-65.
(Modified from Miller and Frederick, 1969.)

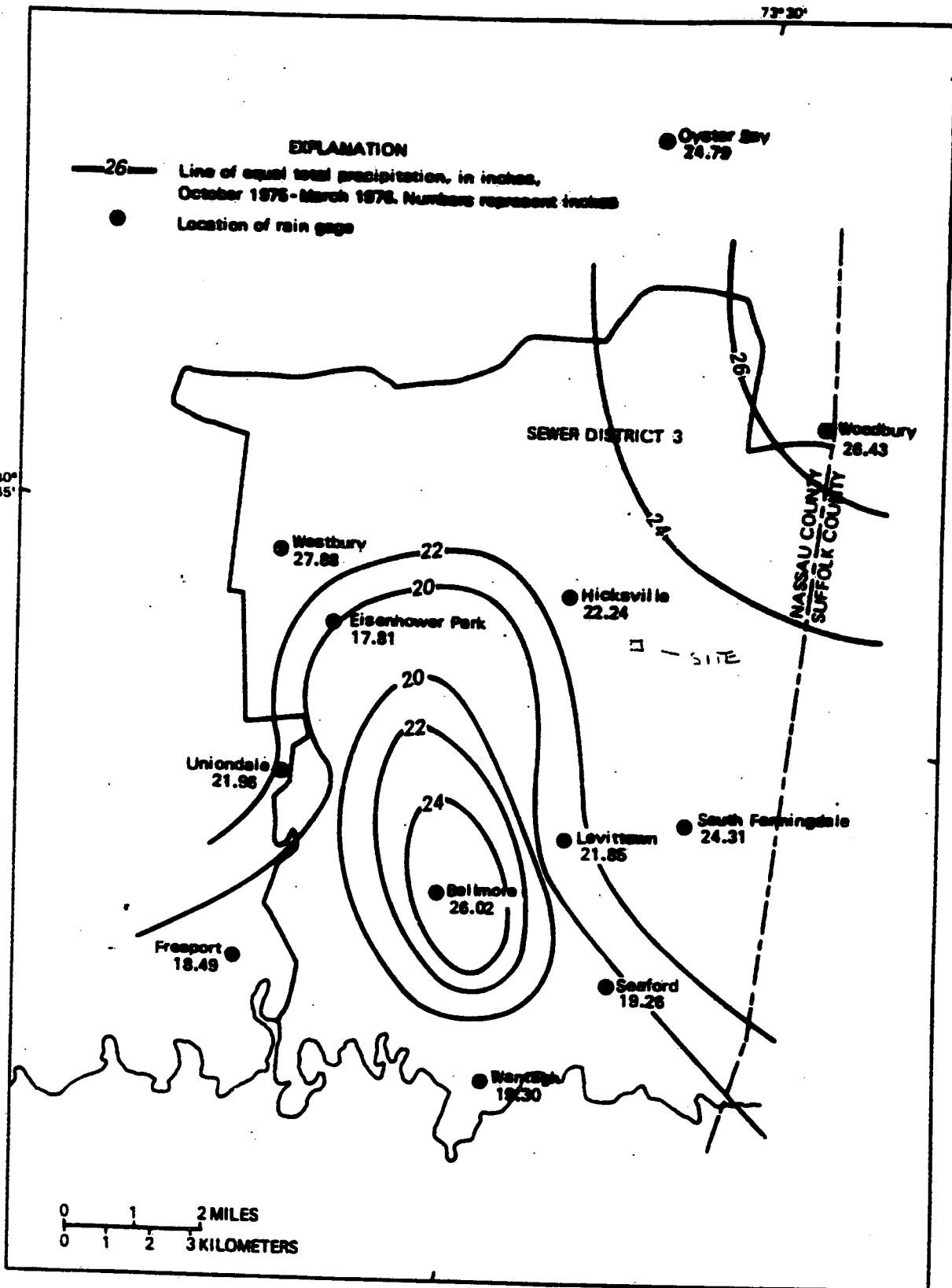


Figure 8A.--Areal distribution of total precipitation in Sewer District 3 during cool season, October 1975 to March 1976.

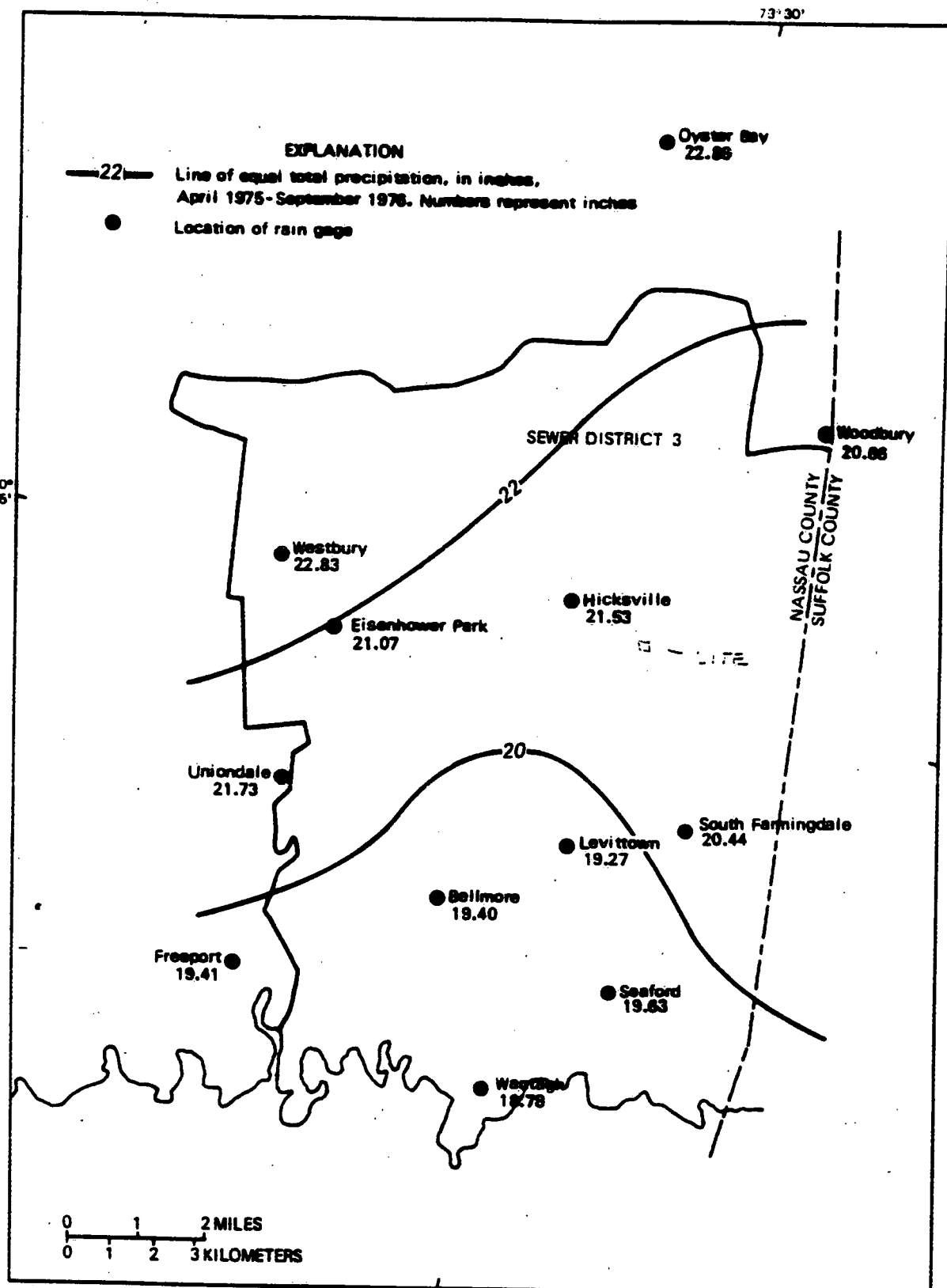


Figure 8B.--Areal distribution of total precipitation in Sewer District 3 during warm season, April to September 1976.

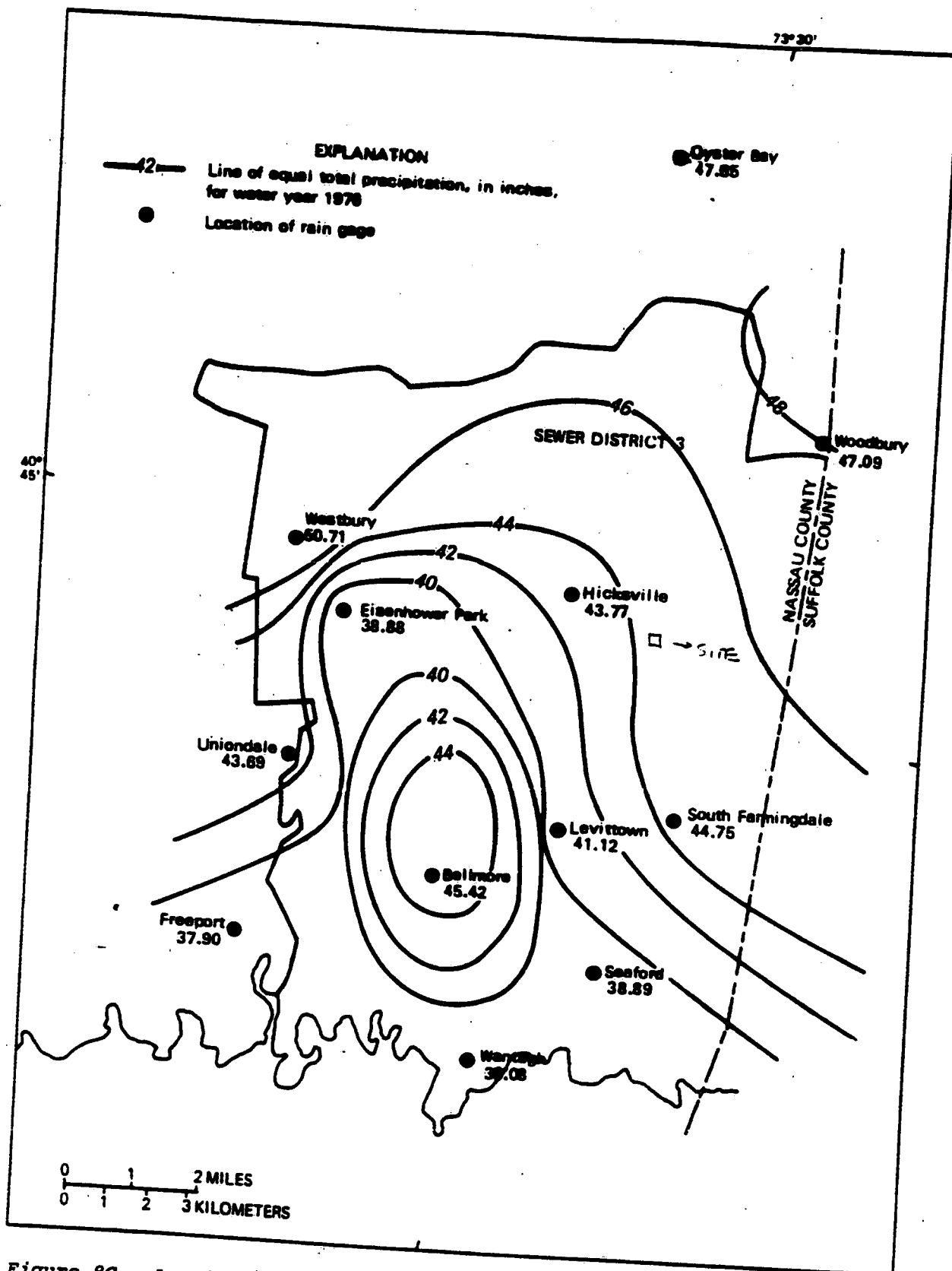


Figure 8C.--Areal distribution of total precipitation in Sewer District 3 during water year 1976.

Public-Supply Wells

Pumpage

Pumpage from public-supply wells in Nassau County during 1975 was 170 Mgal/d; total pumpage that year in Sewer District 3 was approximately 53 Mgal/d. Table 6 summarizes pumpage in the water districts of Sewer District 3 by aquifer; figure 23 shows the distribution of public-supply pumpage in Sewer District 3 during 1975.

The increase in pumpage from public-supply wells by water districts in Sewer District 3 during 1950-76 is summarized in table 7. The pattern of the increases in ground-water withdrawals is illustrated by pumpage totals of

Table 6.--Summary of pumpage by aquifer from public-supply wells in Sewer District 3, Nassau County, 1975

[Locations of water districts are shown in figure 23]

Water District	Population	Pumpage (in thousands of gallons)			
		Upper glacial	Magothy	Lloyd	Total
New York Water Service	171,080	0	4,495,808	0	4,495,808
Massapequa	51,000	0	1,598,496	0	1,598,496
Farmingdale	9,925	0	347,644	0	347,644
South Farmingdale	55,000	152,603	1,159,589	0	1,312,192
East Meadow	50,000	0	1,694,502	0	1,694,502
Levittown	50,000	0	1,330,975	0	1,330,975
Bethpage	32,950	0	1,033,280	0	1,033,280
Hicksville	60,000	0	2,022,257	0	2,022,257
Plainview	46,000	0	1,553,144	0	1,553,144
Jericho	58,100	0	2,754,043	0	2,754,043
Westbury	18,000	0	758,172	93,345	851,517
Carle Place	10,000	0	438,283	0	438,283
TOTAL					19,432,141 (53.2 Mgal/d)

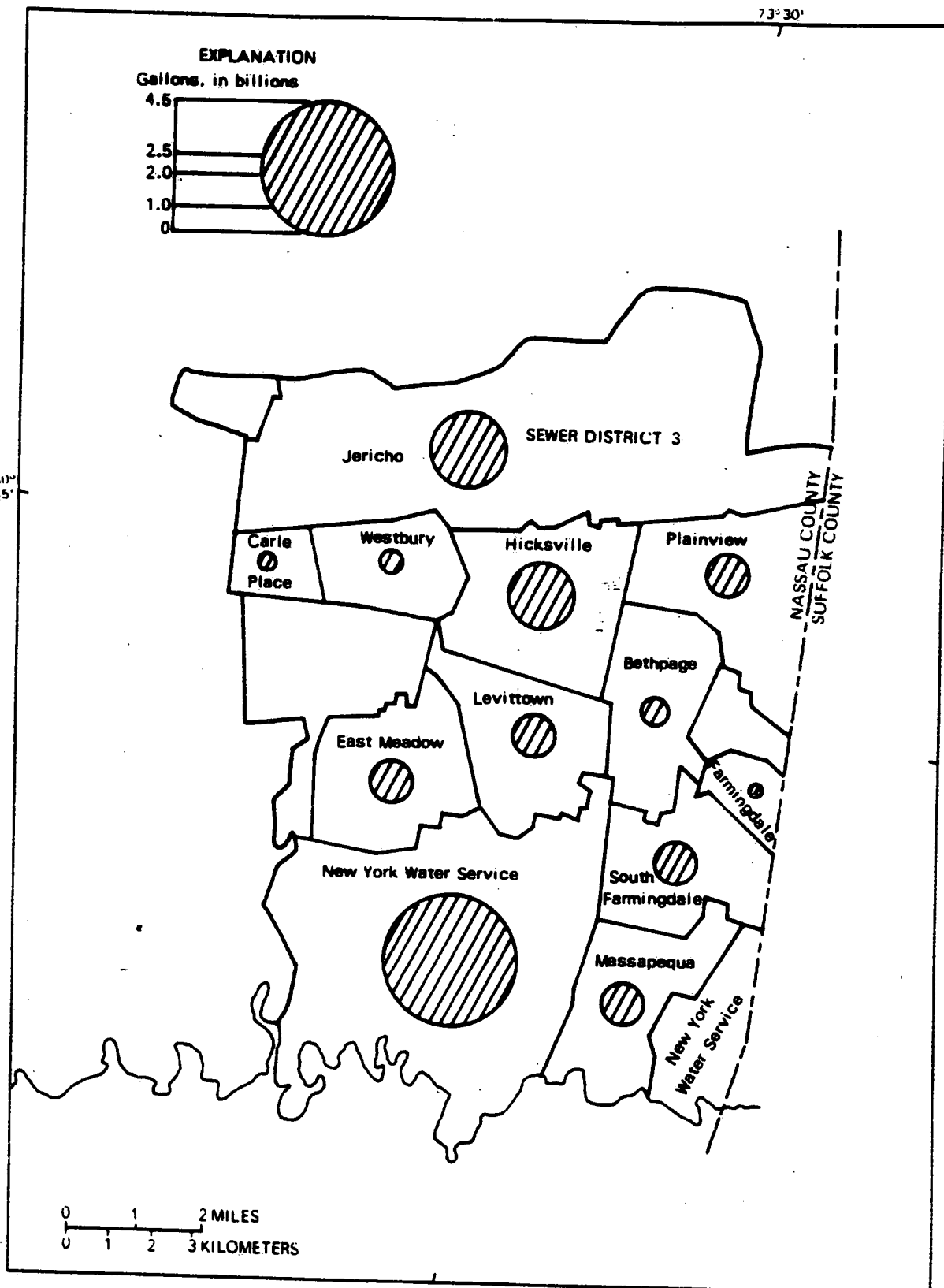


Figure 23.--Water districts in Sewer District 3 and pumpage from each during 1975.

Table 7.--Pumpage from public-supply wells in water districts, southeast Nassau County

[in million gallons per day]

Year	Water District											
	N.Y. Water Service	Mass- apequa	Farm- ingdale	So. Farm- ingdale	East Meadow	Levit- town	Bethpage	Hicks- ville	Plainview	Jericho	Westbury	Carle Place
1950	2.55	-	0.44	-	0.11	2.99	-	1.32	-	1.24	0.86	0.49
1951	3.57	-	.50	-	.60	3.33	1.05	2.31	-	1.77	1.30	.59
1952	4.61	-	.60	-	1.33	3.54	1.40	2.54	-	1.94	1.33	.61
1953	6.15	-	.87	-	1.90	3.72	1.49	3.29	-	2.76	1.69	.71
1954	6.83	0.07	.50	1.10	2.10	3.73	1.48	3.61	0.44	3.02	1.86	.77
1955	7.88	.30	.59	1.43	2.65	5.24	1.81	4.32	1.25	3.41	2.29	.86
1956	7.05	.60	.54	1.66	2.58	4.31	1.74	4.12	1.52	3.22	2.15	.75
1957	8.39	1.17	.64	2.52	3.13	5.73	2.24	5.05	2.08	4.78	2.91	.97
1958	7.71	.87	.62	2.21	2.88	4.16	1.93	4.45	2.00	4.07	2.50	.76
1959	8.77	1.85	.74	2.96	3.36	4.73	2.22	5.41	2.53	5.00	3.07	.90
1960	8.48	1.74	.79	2.97	3.25	4.35	2.19	5.40	2.69	4.97	3.18	.87
1961	7.97	2.44	.85	3.11	3.48	3.90	2.35	5.35	2.93	5.49	2.37	.91
1962	9.14	3.44	.84	3.56	3.77	4.47	2.66	6.09	3.38	6.58	2.52	1.04
1963	9.56	3.64	.76	3.63	3.97	4.92	2.72	6.00	3.72	6.67	3.83	1.12
1964	10.31	3.86	.84	3.89	4.25	5.23	3.04	6.29	4.21	7.70	1.84	1.23
1965	10.56	3.91	.90	3.72	4.22	5.30	3.02	6.58	4.34	9.10	4.48	1.24
1966	11.18	4.00	.93	3.89	4.36	5.55	3.07	6.49	4.40	9.00	4.60	1.27
1967	9.94	3.27	.80	3.36	3.93	4.33	2.60	5.14	3.65	7.55	4.23	1.06
1968	11.25	4.10	.86	3.86	4.36	5.05	2.96	6.20	4.40	8.74	4.40	1.16
1969	11.50	4.19	.80	3.72	4.25	4.75	2.86	6.44	4.19	8.24	3.09	1.17
1970	12.34	4.40	.87	3.93	4.96	4.96	3.13	6.37	4.47	8.52	4.10	1.24
1971	12.63	4.25	.92	4.05	4.84	5.13	3.32	6.63	4.45	9.04	4.14	1.23
1972	12.08	3.58	.96	3.81	4.27	3.89	3.03	5.92	4.41	8.55	3.91	1.29
1973	12.26	4.26	1.02	3.92	3.98	3.84	3.00	6.21	4.59	8.62	4.18	1.34
1974	12.81	4.59	1.11	3.94	4.19	3.95	3.13	5.44	4.56	8.42	3.87	1.37
1975	12.32	4.38	.95	3.60	4.64	3.65	2.83	5.54	4.26	7.55	2.33	1.20
1976	13.46	5.28	.96	3.85	4.48	4.10	2.96	6.05	4.80	8.85	2.52	1.46

New York Water Service (fig. 23), which is the largest supplier in the study area. Between 1950 and 1960, pumpage increased by 5.93 Mgal/d; pumpage between 1960 and 1970 increased by 3.86 Mgal/d; but pumpage since 1970 has increased by only 1.12 Mgal/d. Throughout Sewer District 3, pumpage increased from 10 Mgal/d in 1950 to 53 Mgal/d in 1975, about a fivefold increase.

In 1975, water use ranged from 0.21 (Mgal/d)/mi² in the Jericho Water District to 0.91 (Mgal/d)/mi² in the Carle Place Water District. Average water use among the districts was 0.5 (Mgal/d)/mi². When sewer installations are completed, most of the water use will be consumptive because approximately 85 percent of the pumped water will be routed to sewer lines. The rest will be used for lawn sprinkling and other outdoor use, and part of it will infiltrate back to the water table. By 1985, water use in Sewer District 3 is expected to range from 0.21 (Mgal/d)/mi² in the Jericho Water District to 1.69 (Mgal/d)/mi² in the Westbury Water District. These estimates are derived from pumpage figures given in Kimmel and others (1977). Average water use by 1985 is expected to be 0.94 (Mgal/d)/mi².

Water Loss

Greeley and Hansen (1971, p. 84) estimated water loss (including sewage disposal, evapotranspiration from sprinkling, and consumptive losses) in each water district for 1990. If specific yield of 20 percent is assumed for the water-table aquifer in Sewer District 3, the average water-level decline in response to the estimated hydrologic losses would range from 3.1 ft to 17 ft. Water-level declines in response to losses from storage are predicted to be slightly greater than the 3-ft to 16-ft decline predicted by the analog-model studies of Ku and others (1977), which take into account subsurface outflow from district to district, streamflow decreases, and lower population predictions.

Water Quality

The quality of the public-water supply of Nassau County is monitored by the Nassau County Department of Health, as well as by the various water suppliers. Records for 11 public-supply wells in the area having extensive water-quality data and suitable areal distribution were used to compute the trend of nitrate, chloride, and total solids with time. Trend lines were fitted through data points by the least-square method of analysis. Figure 24 shows that concentrations of nitrate (as N), chloride, and total solids increased from the 1950's to 1973 at the 11 selected wells. Smith and Baier (1969) state that water from 24 percent of the public-supply wells in Nassau County had increasing nitrate trends in 1969 and that the nitrate (as N) concentration of water from 16 percent of the public-supply well will exceed the drinking-water limit of 10 mg/L within 50 years. Effluent from cesspools is cited as the primary source of nitrate in the Nassau County Water Supply.

Sections showing vertical distribution of nitrate, chloride, and total-solids concentrations indicate that these constituents have moved downward into the aquifers in a range from tens of feet to a few hundred feet from the 1950's to 1976 (Ku and Sulam, 1976).

Perlmutter and Koch (1972) have shown that most Magothy aquifer wells whose water has a significantly increasing nitrate concentration lie in a central band running east-west across Nassau County. This is because under natural conditions the vertical (downward) movement of water in the vicinity of the major ground-water divide is more rapid than in other parts of the study area. As a result, elevated concentrations of nitrate and other constituents of ground water tend to lie at greater depths near the divide than elsewhere.

The rate of vertical movement of water near the ground-water divide is estimated to be 5 to 25 ft per year and to average 10 ft per year (Perlmutter and Koch, 1972). At this rate, water would move 500 ft from the water table to the base of the Magothy aquifer in about 50 years. Using a steady-state electric-analog model, Franke and Cohen (1972) estimated that it would take 100 years for water to move from the water table to the base of the Magothy aquifer (500 ft) along the Nassau-Suffolk County boundary at the ground-water divide. However, the rates of vertical movement would be accelerated by pumping.

In areas of Hicksville and Levittown, large-scale farming and associated use of fertilizers since 1920 (Perlmutter and Koch, 1972) has undoubtedly contributed nitrate to the ground-water system. More recently, fertilizers applied to lawns and gardens have become sources of nitrate in ground water.

The lowest concentrations of nitrate, chloride, and total solids in the Magothy aquifer are south of a line running from North Merrick to South Farmingdale (fig. 1).

Median nitrate (as N) concentrations of untreated water from all public-supply wells in the water districts and villages in Sewer District 3 ranged from 0.02 mg/L to 4.0 mg/L (table 8). The pH of untreated public-supply water ranged from 5.1 to 6.7. Specific conductance ranged from 35 to 120 $\mu\text{mho/cm}$, which indicates that the water has a low mineral content.

Iron and manganese enter ground water as a result of bacterial action or the solvent action of water on minerals or manmade products containing these elements. Iron is ubiquitous in ground water on Long Island. However, manganese in ground water is usually attributed to bacterial action at shallow depths. Manganese was virtually absent in public-supply wells in Sewer District 3 (table 8), whereas iron concentrations ranged from 0 to 0.49 mg/L. Pluhowski and Kantrowitz (1964) found that iron in excess of 0.3 mg/L with an absence of manganese can occur in all aquifers underlying Long Island and is probably the result of the solution of iron-bearing minerals or iron oxide within the aquifer.

Median hardness of water (as CaCO_3) differs greatly from well to well and ranged from 6 to 32 mg/L during the 3-year study. In water districts where hardness (as CaCO_3) was less than 10 mg/L, ion exchange resulting from water percolating through clay lenses in the aquifer was the most likely contributing factor (Pluhowski and Kantrowitz, 1964, p. 56).

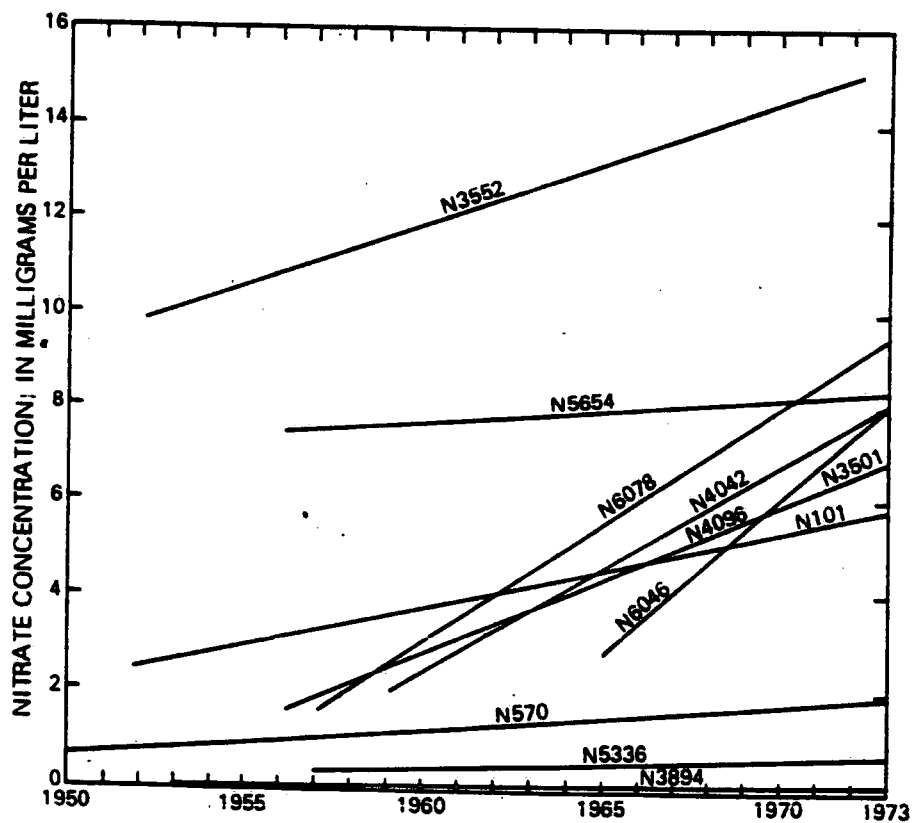
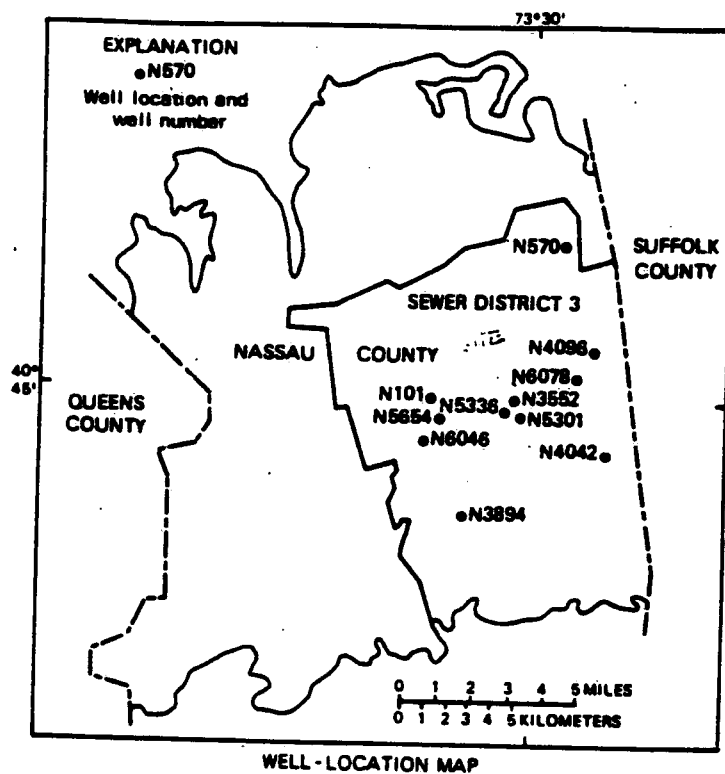


Figure 24.--Trend of nitrate in well water in Sewer District 3, 1950's through 1973. (From Ku and Sulam, 1976.)

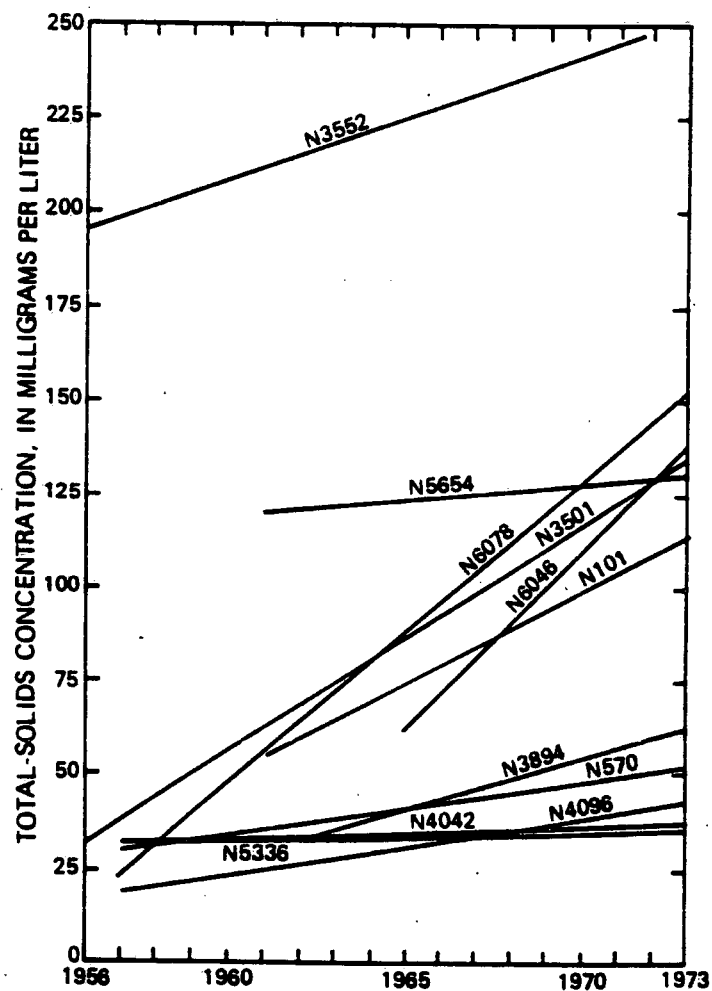
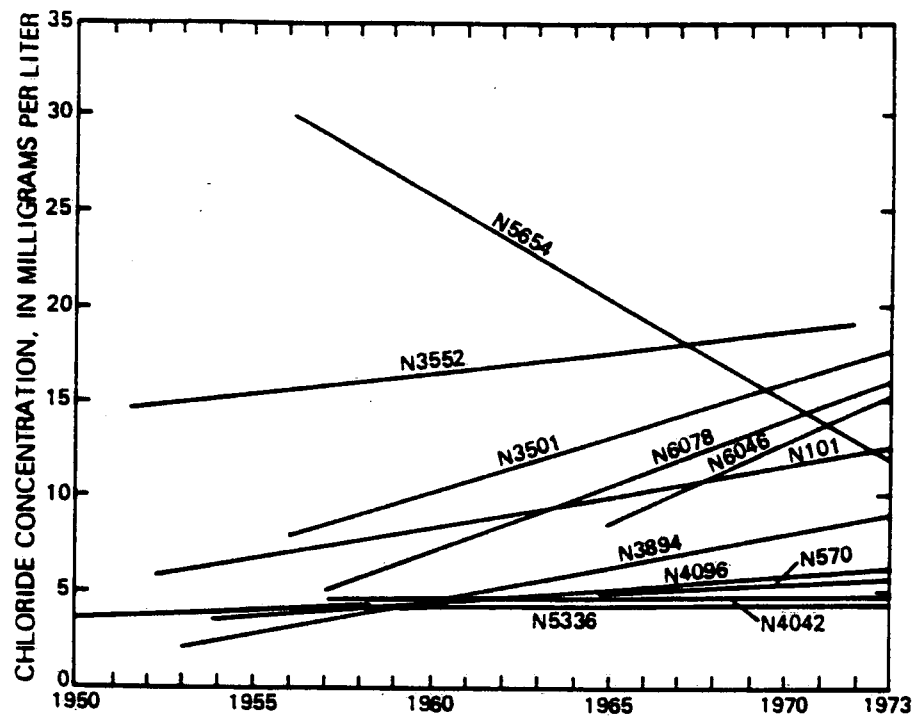


Figure 24 (continued).--Trends of chloride and total-solids concentration in well water in Sewer District 3, 1950's through 1973. (From Ku and Sulam, 1976.)

REFERENCE NO. 14

WESTERN**PROJECT NOTE**TO: Project File: - Servo CorporationDATE: September 1996FROM: Tonya BallaW.O. NO.: 04200-022-081-0129-05SUBJECT: Drinking Water Supply

Groundwater is used extensively as a source of drinking water within 4 miles of the Servo Corporation site. This area is entirely supplied by water from municipal supplies. There is a portion of 13 water districts within a 4-mile radius of the site. The water districts and number of wells per district within 4 miles of the site are:

Bowling Green	(2)	6000 per well
Bethpage	(14)	2321
East Meadow	(10)	\$545
Farmingdale	(3)	2201
Hicksville	(26)	1838
Jamaica	(1)	5416
Jericho	(8)	2636
Levitt	(20)	2500
New York State Water Service	(4)	9611
Oyster Bay	(1)	2125
Painview	(11)	3181
South Farmingdale	(7)	4063
Westbury	(7)	2727

All of the above wells with the exception of 2 wells in the Levitt Water District, are screened in the Magothy aquifer. Two Levitt W.D. wells are screened in the upper glacial aquifer. The two aquifers are interconnected and act as a single hydrogeologic unit.

WESTERN

PROJECT NOTE Cont.

TO: Project File - Sewo Corporation DATE: September 1996
FROM: Tonya Balla W.O. NO.: 0129
SUBJECT: Drinking Water Supply - Cont.

Water districts that back up to each other have an interconnection to each other. This interconnection is for emergency use only. According to the Nassau City Dept. of Health, in all 50 districts, the emergency connection was only used for 2 times last year. Therefore, each water district will be considered as separate and that only water within a water district is blended.

THOMAS S. GULOTTA
COUNTY EXECUTIVE



KATHLEEN A. GAFFNEY, M.D., M.P.H.
COMMISSIONER

COUNTY OF NASSAU
DEPARTMENT OF HEALTH
240 OLD COUNTRY ROAD
MINEOLA, N.Y. 11501-4250

RECEIVED
SEP 3 1996

August 28, 1996

Tonya Balla
Roy F. Weston, Inc.
Suite 400
3 Hawthorn Parkway
Vernon Hills, Illinois 60061-1450

Re: Foil Request

Dear Ms. Balla:

Per your request, enclosed is a listing of public supply wells within a four (4) mile radius of the approximate site you selected and a copy of the 1996 "Ground Water Facts Report". The actual radius was calculated from supply well number N-08778. Information which was available from our database is included on the well listings and any additional information which you require should be available in the "Ground Water Facts Report".

If you have any questions regarding this material or require additional assistance, please contact me at (516) 571-3323.

Very truly yours,

A handwritten signature in dark ink, appearing to read "Donald Irwin".

Donald Irwin
Public Health Sanitarian
Bureau of Water Supply Protection

NASSAU COUNTY DEPARTMENT OF HEALTH
BUREAU OF WATER SUPPLY PROTECTION

N.Y. STATE DEC WELL NUMBER	LOCAL WELL NUMBER	WATER SYSTEM NAME	COMMUNITY	TOWN	LATITUDE (Approx.)	LONGITUDE (Approx.)	AUTHORIZED CAPACITY	AQUIFER	BOTTOM SCREEN DEPTH	TOP SCREEN DEPTH	LAND SURFACE ELEVATION
N-08956	1	BOWLGRN	BOWL GR	TOH	404509	733334	1400	MAGOTHY	530	470	120
N-08957	2	BOWLGRN	BOWL GR	TOH	404509	733334	1400	MAGOTHY	584	524	120
N-03142	4	BTHPG	BTHPG	TOB	404545	732841	700	MAGOTHY	163	122	137
N-03147	5	BTHPG	BTHPG	TOB	404547	732849	500	MAGOTHY	233	192	137
N-03876	6-1	BTHPG	PLNEDGE	TOB	404353	732912	1400	MAGOTHY	386	328	90
N-06078	9	BTHPG	BTHPG	TOB	404537	732848	1400	MAGOTHY	275	225	125
N-06915	10	BTHPG	BTHPG	TOB	404400	732832	1400	MAGOTHY	608	558	85
N-06915A	10	BTHPG	BTHPG	TOB	404403	732831	1400	MAGOTHY	475	422	85
N-06916	11	BTHPG	BTHPG	TOB	404400	732832	1400	MAGOTHY	611	563	85
N-08004	5-1	BTHPG	BTHPG	TOB	404343	732843	1400	MAGOTHY	740	679	80
N-08767	7	BTHPG	BTHPG	TOB	404532	732848	1400	MAGOTHY	233	145	125
N-08767A	7-A	BTHPG	BTHPG	TOB	404532	732848	1400	MAGOTHY	640	579	125
N-08768	8	BTHPG	BTHPG	TOB	404533	732848	1400	MAGOTHY	235	153	125
N-08768A	8-A	BTHPG	BTHPG	TOB	404533	732848	1400	MAGOTHY	678	605	125
N-08941	6-2	BTHPG	PLNEDGE	TOB	404354	732912	1400	MAGOTHY	770	700	90
N-09591	BGD-1	BTHPG	BTHPG	TOB	404524	732826	1380	MAGOTHY	682	616	120
N-03456	1	E MEAD	E MEAD	TOH	404302	733325	1500	MAGOTHY	555	494	85
N-03456A	1	E MEAD	E MEAD	TOH	404303	733033	910	MAGOTHY	320	280	85
N-03457	2	E MEAD	E MEAD	TOH	404310	733316	1050	MAGOTHY	320	280	85
N-03465	3	E MEAD	E MEAD	TOH	404305	733331	1500	MAGOTHY	580	519	85
N-03465A	3	E MEAD	E MEAD	TOH	404306	733330	810	MAGOTHY	297	268	85
N-04447	4	E MEAD	E MEAD	TOH	404311	733327	1200	MAGOTHY	330	280	85
N-04448	5	E MEAD	E MEAD	TOH	404306	733329	1200	MAGOTHY	550	500	85
N-05321	9	E MEAD	E MEAD	TOH	404245	733202	1200	MAGOTHY	509	449	65
N-05322	10	E MEAD	E MEAD	TOH	404243	733158	1200	MAGOTHY	510	470	65
N-07797	11	E MEAD	E MEAD	TOH	404310	733316	1450	MAGOTHY	545	485	85
N-01937	2-1	FRMGDL	FRMGDL	TOB	404409	732711	800	MAGOTHY	146	121	120
N-06644	2-2	FRMGDL	FRMGDL	TOB	404409	732713	1400	MAGOTHY	222	175	120
N-11004	2-3	FRMGDL	FRMGDL	TOB	404409	732711	NA	NA	NA	NA	NA
N-00148	2-1	HKSVL	HKSVL	TOB	404441	733207	650	MAGOTHY	153	133	120
N-00149	1-1	HKSVL	HKSVL	TOB	404626	733112	640	MAGOTHY	152	127	165

NASSAU COUNTY DEPARTMENT OF HEALTH
BUREAU OF WATER SUPPLY PROTECTION

N.Y. STATE DEC WELL NUMBER	LOCAL WELL NUMBER	WATER SYSTEM NAME	COMMUNITY	TOWN	LATITUDE (Approx.)	LONGITUDE (Approx.)	AUTHORIZED CAPACITY	AQUIFER	BOTTOM SCREEN DEPTH	TOP SCREEN DEPTH	LAND SURFACE ELEVATION
N-02072	1-3	HKSVL	HKSVL	TOB	404639	733111	600	MAGOTHY	159	138	165
N-03488	3-1	HKSVL	HKSVL	TOB	404445	733104	1200	MAGOTHY	169	116	115
N-03552	4-1	HKSVL	HKSVL	TOB	404454	733203	1200	MAGOTHY	169	116	120
N-03553	5-1	HKSVL	HKSVL	TOB	404453	733246	1200	MAGOTHY	152	99	115
N-03878	6-2	HKSVL	HKSVL	TOB	404624	733233	1200	MAGOTHY	428	375	145
N-03953	6-1	HKSVL	HKSVL	TOB	404628	733237	1200	MAGOTHY	419	169	145
N-05336	2-2	HKSVL	HKSVL	TOB	404441	733207	1200	MAGOTHY	523	472	120
N-06190	7-1	HKSVL	HKSVL	TOB	404707	733053	1200	MAGOTHY	600	550	175
N-06191	7-2	HKSVL	HKSVL	TOB	404707	733049	1200	MAGOTHY	550	489	175
N-06192	8-1	HKSVL	HKSVL	TOB	404517	733102	1400	MAGOTHY	626	575	135
N-06193	8-2	HKSVL	HKSVL	TOB	404517	733105	1400	MAGOTHY	467	396	135
N-07561	5-2	HKSVL	HKSVL	TOB	404455	733249	1400	MAGOTHY	550	463	115
N-07562	1-4	HKSVL	HKSVL	TOB	404639	733111	1400	MAGOTHY	545	458	165
N-08249	1-5	HKSVL	HKSVL	TOB	404639	733111	1400	MAGOTHY	490	400	165
N-08525	3-2	HKSVL	HKSVL	TOB	404446	733057	1400	MAGOTHY	503	432	115
N-08526	4-2	HKSVL	HKSVL	TOB	404455	733203	1400	MAGOTHY	601	520	120
N-08778	9-1	HKSVL	HKSVL	TOB	404537	733046	1400	MAGOTHY	590	529	140
N-08779	9-2	HKSVL	HKSVL	TOB	404537	733046	1400	MAGOTHY	585	524	140
N-09180	8-3	HKSVL	HKSVL	TOB	404517	733102	1400	MAGOTHY	630	545	135
N-09212	5-3	HKSVL	HKSVL	TOB	404453	733246	1400	MAGOTHY	604	538	115
N-09463	10-1	HKSVL	HKSVL	TOB	404601	733150	1380	MAGOTHY	638	560	140
N-09488	1-6	HKSVL	HKSVL	TOB	404628	733112	1380	MAGOTHY	575	515	165
N-10208	9-3	HKSVL	HKSVL	TOB	404537	733046	1750	MAGOTHY	649	572	140
N-10555	11-1	HKSVL	HKSVL	TOB	404606	733015	NA	NA	NA	NA	NA
N-06745	44C	JAMAICA	ELMONT	TOH	404311	733025	1400	MAGOTHY	344	304	75
N-04133	8	JERICO	LOC GRV	TOB	404805	733030	1200	MAGOTHY	450	400	195
N-04245	9	JERICO	JERICO	TOB	404736	733212	1200	MAGOTHY	565	525	220
N-04246	10	JERICO	JERICO	TOB	404802	733132	1200	MAGOTHY	453	403	195
N-06651	14	JERICO	JERICO	TOB	404757	733154	1200	MAGOTHY	610	560	240
N-07030	15	JERICO	JERICO	TOB	404635	733310	1200	MAGOTHY	530	480	160
N-07781	22	JERICO	JERICO	TOB	404751	733220	1200	MAGOTHY	454	394	215
N-08043	23	JERICO	WDBRY	TOB	404757	732833	1200	MAGOTHY	688	515	220

**NASSAU COUNTY DEPARTMENT OF HEALTH
BUREAU OF WATER SUPPLY PROTECTION**

N.Y. STATE DEC WELL NUMBER	LOCAL WELL NUMBER	WATER SYSTEM NAME	COMMUNITY	TOWN	LATITUDE (Approx.)	LONGITUDE (Approx.)	AUTHORIZED CAPACITY	AQUIFER	BOTTOM SCREEN DEPTH	TOP SCREEN DEPTH	LAND SURFACE ELEVATION
N-08355	25	JERICHO	MUTNTWN	TOB	404837	733158	1400	MAGOTHY	590	530	260
N-02402	1	LEVITT	LEVITT	TOH	404401	733149	800	MAGOTHY	208	164	100
N-02403	2	LEVITT	LEVITT	TOH	404400	733142	800	GLACIAL	84	59	100
N-02580	3	LEVITT	LEVITT	TOH	404323	733144	800	MAGOTHY	357	321	85
N-02581	4	LEVITT	LEVITT	TOH	404324	733128	800	GLACIAL	80	54	85
N-03193	5	LEVITT	LEVITT	TOH	404339	733040	1000	MAGOTHY	318	274	90
N-03194	6	LEVITT	LEVITT	TOH	404338	733047	1000	MAGOTHY	258	219	90
N-03312	8	LEVITT	LEVITT	TOH	404315	733035	800	MAGOTHY	304	252	75
N-03313	7	LEVITT	LEVITT	TOH	404309	733028	1000	MAGOTHY	95	64	75
N-03618	6A	LEVITT	LEVITT	TOH	404340	733147	1000	MAGOTHY	418	317	90
N-04450	9	LEVITT	LEVITT	TOH	404323	733148	1200	MAGOTHY	488	415	85
N-04451	10	LEVITT	LEVITT	TOH	404429	733055	1200	MAGOTHY	403	353	110
N-05301	11	LEVITT	LEVITT	TOH	404427	733150	1200	MAGOTHY	377	324	105
N-05302	12	LEVITT	LEVITT	TOH	404248	733143	1200	MAGOTHY	484	431	65
N-05303	13	LEVITT	NO WTGH	TOH	404253	733008	1200	MAGOTHY	508	454	65
N-05303A	13	LEVITT	NO WTGH	TOH	404257	733008	1200	MAGOTHY	512	454	65
N-05304	14	LEVITT	LEVITT	TOH	404225	733043	1200	MAGOTHY	487	415	60
N-07076	5A	LEVITT	LEVITT	TOH	404339	733044	1200	MAGOTHY	674	589	90
N-07523	8A	LEVITT	LEVITT	TOH	404311	733025	1200	MAGOTHY	684	590	75
N-08279	7A	LEVITT	LEVITT	TOH	404309	733029	1200	MAGOTHY	547	389	75
N-08321	2A	LEVITT	LEVITT	TOH	404401	733151	1200	MAGOTHY	674	574	100
N-03780	1S	NYWS	NO WTGH	TOH	404228	732935	1400	MAGOTHY	142	89	60
N-03893	2S	NYWS	NO WTGH	TOH	404228	732934	1400	MAGQTHY	151	98	60
N-08480	3S	NYWS	NO WTGH	TOH	404228	732933	1550	MAGOTHY	658	589	60
N-09338	4S	NYWS	NO WTGH	TOH	404228	732935	2100	MAGOTHY	649	585	60
N-00152	1	O WSTBY	O WSTBY	TNH	404628	733418	500	MAGOTHY	478	438	140
N-04095	1-1	PLNVIEW	PLNVIEW	TOB	404636	732807	1200	MAGOTHY	490	440	170
N-04096	1-2	PLNVIEW	PLNVIEW	TOB	404639	732802	1200	MAGOTHY	494	444	170
N-04097	3-1	PLNVIEW	PLNVIEW	TOB	404631	732939	1200	MAGOTHY	485	413	175
N-06076	4-1	PLNVIEW	PLNVIEW	TOB	404650	732911	1200	MAGOTHY	358	298	160
N-06077	4-2	PLNVIEW	PLNVIEW	TOB	404649	732910	1200	MAGOTHY	460	398	160

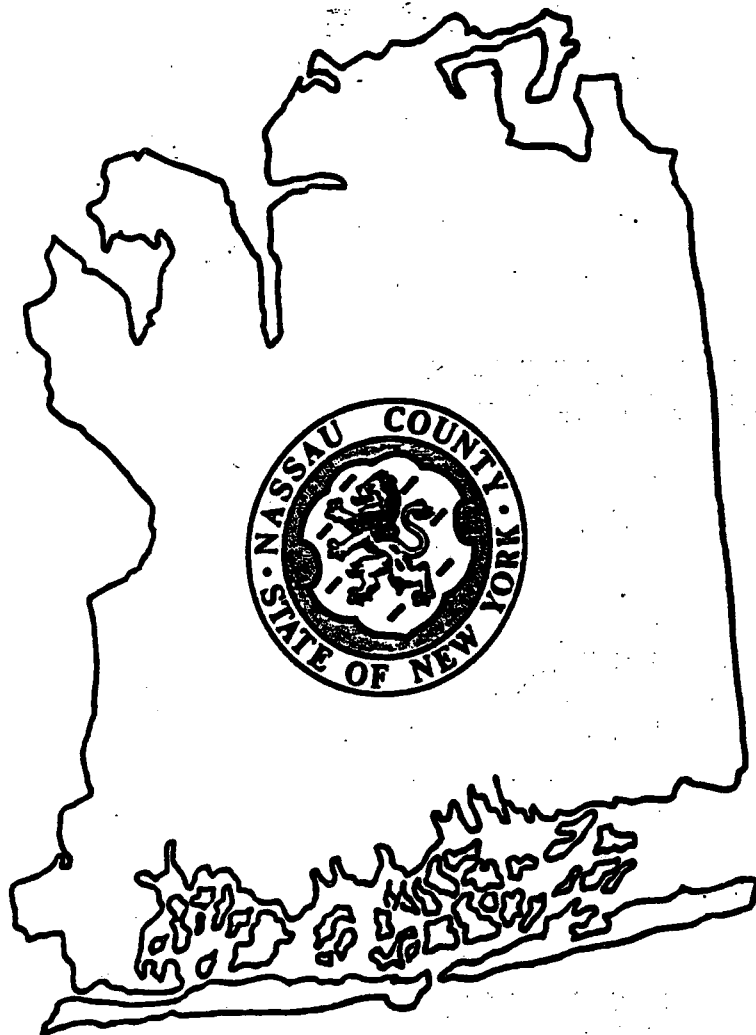
**NASSAU COUNTY DEPARTMENT OF HEALTH
BUREAU OF WATER SUPPLY PROTECTION**

N.Y. STATE DEC WELL NUMBER	LOCAL WELL NUMBER	WATER SYSTEM NAME	COMMUNITY	TOWN	LATITUDE (Approx.)	LONGITUDE (Approx.)	AUTHORIZED CAPACITY	AQUIFER	BOTTOM SCREEN DEPTH	TOP SCREEN DEPTH	LAND SURFACE ELEVATION
N-06580	3-2	PLNVIEW	PLNVIEW	TOB	404630	732938	1200	MAGOTHY	596	523	175
- N-06956	5-1	PLNVIEW	PLNVIEW	TOB	404557	732705	1400	MAGOTHY	597	514	180
- N-07421	5-2	PLNVIEW	PLNVIEW	TOB	404557	732705	1400	MAGOTHY	559	482	180
N-07526	2-1	PLNVIEW	PLNVIEW	TOB	404703	732801	1400	MAGOTHY	688	570	240
- N-08054	5-3	PLNVIEW	PLNVIEW	TOB	404557	732705	1400	MAGOTHY	580	510	180
- N-08595	5-4	PLNVIEW	PLNVIEW	TOB	404557	732705	1350	MAGOTHY	610	540	180
N-04042	1-1	S FMGDL	PLNEDGE	TOB	404309	732745	1100	MAGOTHY	154	96	60
N-04043	1-2	S FMGDL	PLNEDGE	TOB	404309	732749	1200	MAGOTHY	374	322	60
N-05148	1-3	S FMGDL	PLNEDGE	TOB	404311	732747	1200	MAGOTHY	369	298	60
N-06150	3-1	S FMGDL	MSPQ E	TOB	404245	732903	1400	MAGOTHY	607	545	60
N-07377	1-4	S FMGDL	PLNEDGE	TOB	404312	732748	1400	MAGOTHY	758	607	60
N-07515	5-1	S FMGDL	S FMGDL	TOB	404337	732711	1400	MAGOTHY	347	289	65
N-07516	5-2	S FMGDL	S FMGDL	TOB	404337	732711	1400	MAGOTHY	584	494	65
N-02236	8	WSTBY	NEW CSL	TNH	404519	733427	750	MAGOTHY	565	520	110
N-02602	9	WSTBY	NEW CSL	TNH	404516	733434	950	LLOYD	853	760	110
N-05007	10	WSTBY	WSTBY	TNH	404552	733420	1350	MAGOTHY	494	428	120
N-05655	12	WSTBY	NEW CSL	TNH	404541	733335	1050	MAGOTHY	255	205	130
N-06819	12A	WSTBY	NEW CSL	TNH	404537	733335	1050	MAGOTHY	265	215	130
N-07353	14	WSTBY	NEW CSL	TNH	404555	733411	1400	MAGOTHY	390	300	120
N-08497	16	WSTBY	NEW CSL	TNH	404519	733429	1400	MAGOTHY	539	456	110

Nassau County Department of Health

Ground Water And Public Water Supply Facts For Nassau County, New York

July, 1996



Thomas S. Gulotta
County Executive

Kathleen A. Gaffney, M.D., M.P.H.
Commissioner

Nassau County Department Of Health

**Ground Water
And
Public Water Supply Facts
For
Nassau County, New York**

July, 1996

**Thomas S. Gulotta
County Executive**

**Kathleen A. Gaffney, M.D., M.P.H.
Commisioner**

FOREWORD

The purpose of this report is to present in a single document a compilation of Nassau County ground water and water supply information. This report updates the information presented in the report dated July, 1995.

This report was prepared by Louis J. Famiglietti, Senior Public Health Sanitarian, Bureau of Water Supply Protection with the assistance of Public Health Sanitarians Ann L. Nemeck and Donald P. Irwin.

All water quality analyses were performed by New York State Department of Health approved laboratories, including the Nassau County Department of Health Division of Public Health Laboratories, Pedro Franco, M.D., Director and the private laboratories utilized by the 54 public water systems in Nassau County.

This report is part of the Department's continuing programs in public water supply regulation and protection, which are administered in the Department of Health by Bruce B. Smith, P.E., Director, Division of Environmental Health and Donald L. Spiess, Director, Bureau of Water Supply Protection.

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Not to scale

NASSAU COUNTY DEPARTMENT OF HEALTH
PUBLIC WATER SYSTEMS IN NASSAU COUNTY
1995

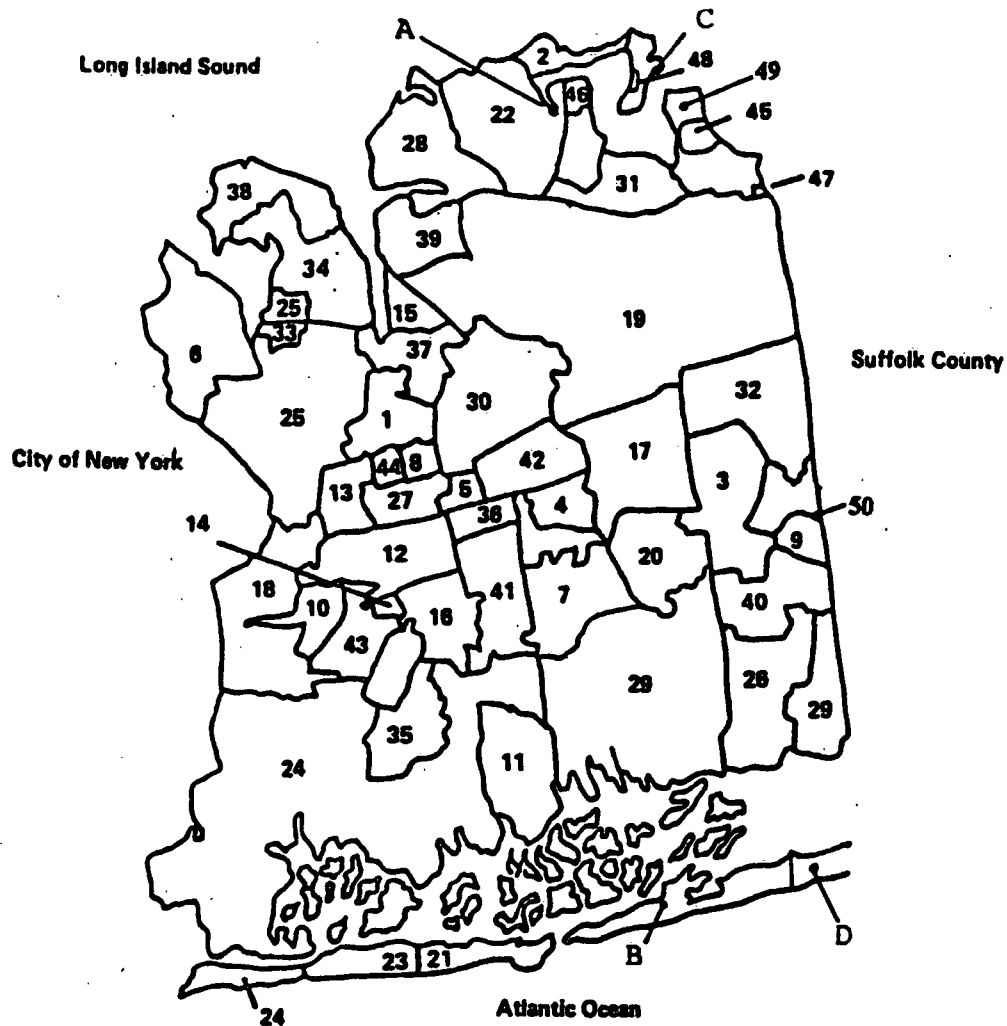
COMMUNITY PUBLIC WATER SYSTEMS(50)

Albertson Water District	Manhasset-Lakeville Water District
Bayville Village	Massapequa Water District
Bethpage Water District	Mill Neck Estates Water Supply
Bowling Green Water District	Mineola Village
Carle Place Water District	New York Water Service Corporation
Deforest Drive Ass'n Water Supply	Northeast Farmingdale Water District
East Meadow Water District	Old Westbury Village
East Williston Village	Oyster Bay Water District
Farmingdale Village	Plainview Water District
Franklin Square Water District	Plandome Village
Freeport Village	Port Washington Water District
Garden City Village	Rockville Centre Village
Garden City Park Water District	Roosevelt Field Water District
Garden City South Water District	Roslyn Water District
City of Glen Cove	Sagamore Hill National Historic Site
Glenwood Water District	Sands Point Village
Hempstead Village	Sea Cliff Water Company
Hicksville Water District	South Farmingdale Water District
Jamaica Water Supply Company	Split Rock Water Supply
Jericho Water District	Swan Cove Water Supply
Levittown Water District	Uniondale Water District
Lido-Pt Lookout Water District	Water Authority of Great Neck North
Locust Valley Water District	Westbury Water District
City of Long Beach	West Hempstead-Hemp Grdns Water District
Long Island Water Corporation	Williston Park Village

NON-COMMUNITY PUBLIC WATER SYSTEMS (4)

Beaver Dam Winter Sports Club	Seawanhaka Yacht Club
Jones Beach State Park	Tobay Beach

PUBLIC WATER SYSTEMS IN NASSAU COUNTY



COMMUNITY WATER SYSTEMS

NON-COMMUNITY WATER SYSTEMS

- | | |
|--|--|
| 1. Albertson Water District | 26. Massapequa Water District |
| 2. Bayville Village | 27. Mineola Village |
| 3. Bethpage Water District | 28. City of Glen Cove |
| 4. Bowling Green Water District | 29. New York Water Service Corp. |
| 5. Carle Place Water District | 30. Old Westbury Village |
| 6. Great Neck North Water Authority | 31. Oyster Bay Water District |
| 7. East Meadow Water District | 32. Plainview Water District |
| 8. East Williston Village | 33. Plandome Village |
| 9. Farmingdale Village | 34. Port Washington Water District |
| 10. Franklin Square Water District | 35. Rockville Centre Village |
| 11. Freeport Village | 36. Roosevelt Field Water District |
| 12. Garden City Village | 37. Roslyn Water District |
| 13. Garden City Park Water District | 38. Sands Point Village |
| 14. Garden City South Water District | 39. Sea Cliff Water Company |
| 15. Glenwood Water District | 40. South Farmingdale Water District |
| 16. Hempstead Village | 41. Uniondale Water District |
| 17. Hicksville Water District | 42. Westbury Water District |
| 18. Jamaica Water Supply Co. | 43. West Hempstead Water District |
| 19. Jericho Water District | 44. Williston Park Village |
| 20. Levittown Water District | 45. Swan Cove Water Supply |
| 21. Lido-Pt. Lookout | 46. Mill Neck Estates Water Supply |
| 22. Locust Valley Water District | 47. Deforest Drive Ass'n Water Supply |
| 23. City of Long Beach | 48. Split Rock Water Supply |
| 24. Long Island Water Corporation | 49. Sagamore Hill National Historic Site |
| 25. Manhasset-Lakeville Water District | 50. Northeast Farmingdale Water District |

- A. Beaver Dam Winter Sports Club
- B. Jones Beach State Park
- C. Seawanhaka Yacht Club
- D. Tobay Beach

Blank Areas - Parks, Lakes or Served by Private Wells

NASSAU COUNTY DEPARTMENT OF HEALTH
PUBLIC WATER SUPPLY INFORMATION
COMMUNITY WATER SYSTEMS IN NASSAU COUNTY
1995

WATER SYSTEM	WELLS		TANKS		INTER-CONNECT-IONS	SERVICES	
	No. (1)	AUTH CAPACITY (MGD) (2)	No.	STORAGE CAPACITY (MG)		No.	METERED (%)
ALBERTSON W.D.	5	7.95	3	3.50	6	4,005	100%
BAYVILLE (V)	4	5.76	1	0.60	2	2,440	100%
BETHPAGE W.D.	9	18.11	2	2.75	14	8,137	100%
BOWLING GREEN W.D.	2	4.03	1	2.00	3	3,014	100%
CARLE PLACE W.D.	5	7.80	1	0.50	5	2,330	100%
GREAT NECK NORTH, W.A. of	11	16.78	3	2.00	2	7,655	100%
DeFOREST DRIVE ASSOC	1	0.06	1	0.02	0	9	0%
EAST MEADOW W.D.	11	20.00	2	2.75	11	12,935	100%
EAST WILLISTON (V)	0	-	0	-	4	856	100%
FARMINGDALE (V)	4	5.54	2	0.90	5	2,340	100%
FRANKLIN SQUARE W.D.	5	8.64	2	1.00	6	5,136	100%
FREEMPT (V)	9	17.39	2	1.50	4	10,000	100%
GARDEN CITY (V)	10	19.05	5	5.10	21	6,686	100%
GARDEN CITY PARK W.D.	10	16.42	2	2.50	9	6,543	100%
GARDEN CITY SOUTH W.D.	0	-	0	-	5	352	100%
GLEN COVE CITY	8	13.74	3	4.25	3	7,388	100%
GLENWOOD W.D.	0	-	0	-	4	181	100%
HEMPSTEAD (V)	9	15.70	4	3.75	13	8,689	100%
HICKSVILLE W.D.	20	39.33	5	7.25	10	15,570	100%
JAMAICA WATER SUPPLY CO	24	40.47	7	11.85	9	27,794	100%
JERICHO W.D.	22	37.50	6	8.79	18	18,226	100%
LEVITTOWN W.D.	12	19.87	2	2.50	5	11,910	100%
LIDO-PT LOOKOUT W.D.	3	4.90	2	1.50	1	1,884	100%
LOCUST VALLEY W.D.	5	8.66	1	1.00	5	2,379	100%
LONG BEACH CITY	8	14.18	3	3.83	2	7,560	100%
LONG ISLAND WATER CORP	38	84.14	11	13.65	13	72,283	100%
MANHASSET-LAKEVILLE W.D.	18	33.74	6	8.50	11	9,914	100%
MASSAPEQUA W.D.	8	16.50	4	4.00	7	13,750	100%
MILL NECK ESTATES W.S.	2	0.32	1	0.06	0	85	0%
MINEOLA (V)	6	9.00	2	2.00	12	5,440	100%
NEW YORK W.S. CORP	18	49.46	5	5.75	9	44,000	100%
N/E FARMINGDALE W.D.	0	-	0	-	1	168	100%
OLD WESTBURY (V)	5	6.92	2	2.00	10	1,450	100%
OYSTER BAY W.D.	4	7.20	4	1.80	2	2,410	100%
PLAINVIEW W.D.	10	20.43	3	4.75	9	10,185	100%
PLANDOME (V)	0	2.09	1	0.02	2	430	100%
PORT WASHINGTON W.D.	13	14.85	4	22.38	9	8,509	100%
ROCKVILLE CENTRE (V)	11	19.30	4	3.75	4	7,291	81%
ROOSEVELT FIELD W.D.	3	10.19	1	1.00	7	377	100%
ROSLYN W.D.	8	13.97	4	6.30	10	8,743	100%
SAGAMORE HILL N.H.S.	3	0.29	3	0.02	0	5	
SANDS POINT (V)	6	5.11	3	0.65	3	1,245	100%
SEA CLIFF WATER CO	3	6.52	2	0.74	5	4,348	100%
SOUTH FARMINGDALE W.D.	11	20.74	4	3.20	17	12,500	100%
SPLIT ROCK W.S.	2	0.04	1	<0.01	0	9	0%
SWAN COVE W.S.	1	0.14	1	0.13	0	20	0%
UNIONDALE W.D.	6	10.80	1	1.25	16	5,761	100%
WESTBURY W.D.	11	19.80	2	2.50	5	5,853	100%
W HEMP-HEMP GARDENS W.D.	10	16.92	3	2.65	9	8,366	100%
WILLISTON PARK (V)	4	7.31	2	2.00	9	2,400	100%
NASSAU COUNTY TOTAL	398	717.66	134	158.94	337	397,201	99.6%

(1) Includes wells not used, but not abandoned.

(2) Capacity authorized by NYSDEC as part of well permit. All may not be usable.

SOURCES:

NCDH records, 1995

NCDH records, includes wells not used but not abandoned.

1991 Water Supply Emergency Plan.

Community Water System Sampling Site Plans, 1995.

Public Water System Annual Inspection Reports, NCDH, 1995

COMMUNITY PUBLIC WATER SYSTEM ESTIMATED POPULATION,
ANNUAL PUMPAGE AND PER CAPITA DAILY CONSUMPTION IN 1995
NASSAU COUNTY, NEW YORK

WATER SYSTEM	ESTIMATED POPULATION (a)	ANNUAL PUMPAGE (Galx1000) (b)	IMPORTED OR (EXPORTED) (Galx1000) (a)	GALLONS PER CAPITA DAY (GPCD)
ALBERTSON WD	13,500	659,738		134
BAYVILLE (V)	8,800	283,362		88
BETHPAGE WD	32,500	1,207,325		102
BOWLING GREEN WD	12,000	482,989		110
CARLE PLACE WD	8,950	482,147		148
GREAT NECK NO. WA of	31,301	1,521,847		133
DEFOREST DR ASSOC	21	(c)		(c)
EAST MEADOW WD	50,000	2,474,048		136
EAST WILLISTON (V)	2,515	0	188,060	205
FARMINGDALE (V)	8,804	359,980		112
FRANKLIN SQUARE WD	20,000	675,837		93
FREEMPORT (V)	40,000	1,687,795		116
GARDEN CITY PARK WD	21,000	1,167,108		152
GARDEN CITY SOUTH WD	1,500	0	(c)	(c)
GARDEN CITY (V)	21,686	1,315,775		166
GLEN COVE CITY	28,000	1,401,856		137
GLENWOOD WD	640	0	69,311	297
HEMPSTEAD (V)	50,500	2,133,050		116
HICKSVILLE WD	47,810	2,189,679		125
JAMAICA WS CO	130,000	3,408,160		72
JERICHO WD	58,000	4,628,000		219
LEVITTOWN WD	50,000	2,038,235		112
LIDO-PT LOOKOUT WD	4,500	300,752		183
LOCUST VALLEY WD	7,500	547,392		200
LONG BEACH CITY	35,000	1,206,385		94
LONG IS WATER CORP	230,800	9,709,489		115
MANHASSET-LAKE WD	43,000	2,167,972	(191,057)	126
MASSAPEQUA WD	46,000	1,941,390		116
MILL NECK EST WS	240	(c)		(c)
MINEOLA (V)	21,500	1,006,060		128
N/E FARMINGDALE WD	300	INCLUDED IN VILLAGE OF FARMINGDALE		
NY WATER SERVICE CORP	173,000	4,958,328		79
OLD WESTBURY (V)	3,100	588,690		520
OYSTER BAY WD	8,500	390,316		126
PLAINVIEW WD	35,000	1,678,126		131
PLANDOME (V)	1,450	0	90,967	172
PORT WASHINGTON WD	30,000	1,279,197	100,090	126
ROCKVILLE CENTRE (V)	28,000	1,322,979		129
ROOSEVELT FIELD WD	1,900	893,758		(d)
ROSLYN WD	17,000	1,210,162	(69,311)	184
SAGAMORE HILL N.I.S.	12	(c)		
SANDS POINT (V)	2,500	288,100		316
SEA CLIFF WATER CO	17,500	443,300		69
SWAN COVE WS	51	(c)		(c)
SO FARMINGDALE WD	44,700	1,545,376		95
SPLIT ROCK WS	25	(c)		(c)
UNIONDALE WD	23,000	859,897		102
WESTBURY WD	30,000	1,061,990		97
WEST HEMPSTEAD WD	32,000	1,002,019		86
WILLISTON PARK (V)	7,500	202,580	(188,060)	5
TOTAL	1,481,605	62,721,189		116

(a) Reported by public water systems in Annual Water Supply Statements or monthly operation reports for 1995.

(b) Total pumpage from NYSDEC.

(c) Not Available

(d) Not Applicable. Transient Population; water used mainly for cooling and industrial use.

PHONE CONVERSATION RECORD

Conversation with:

Name Don Irwin

Company Nassau Cty Dept. of Health

Address _____

Phone (516) 571-3323

Subject Nassau Cty well System - foil Request

Date Sept 17 / 96

Time 1135 AM / PM

☒ Originator Placed Call

☐ Originator Received Call

W.O. No. _____

Notes:

Spoke to Mr. Irwin about interconnections in the Nassau Cty Water System.

- All wells in a water district are mixed (interconnected).

- Each well district is interconnected to the adjoining well districts surrounding it. However, this interconnection is only used in an emergency. An emergency happens once or twice a year for the entire Cty (approx 50 well districts). The emergency interconnections are tested annually.

☐ File _____

☐ Tickle File _____ / _____ / _____

☐ Follow-Up By: _____

☐ Copy/Route To: _____

Follow-Up-Action: _____

Originator's Initials TCB

REFERENCE NO. 15

WESTERN**PROJECT NOTE**

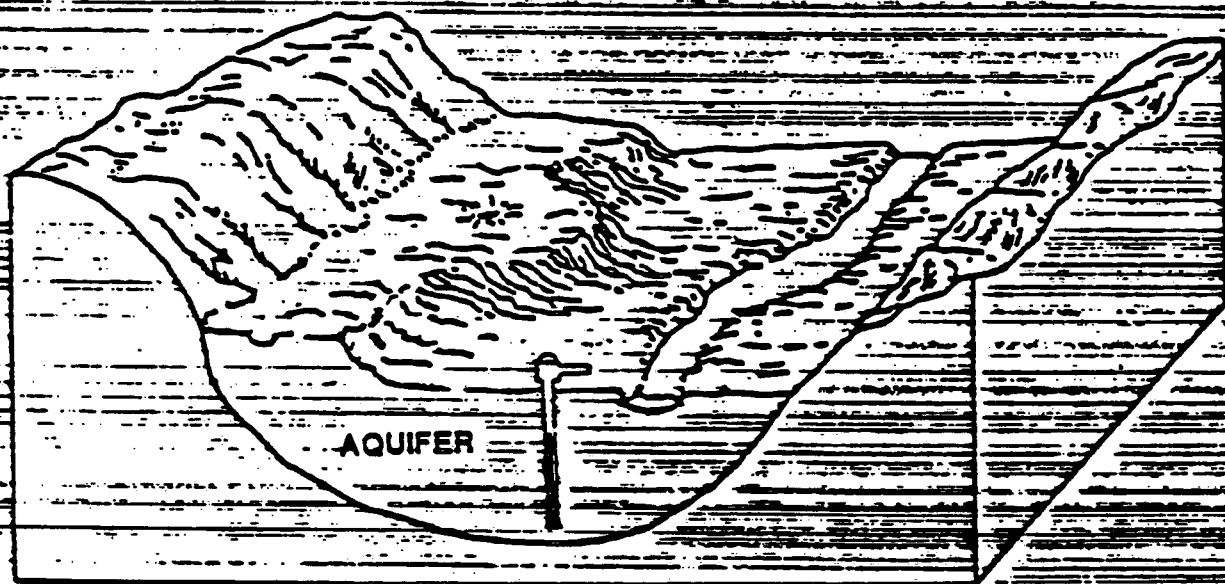
TO: Project File - Servo Corporation DATE: September 1996
FROM: Tonya Balla W.O. NO.: 04200-022-081-0129-05
SUBJECT: Well head Protection Areas (WHPA)

According to the 1991 Site Inspection Report, Nassau County has not developed a Wellhead Protection Area Program. However, a small portion of the 4 mile radius surrounding the site falls into Suffolk County. Suffolk County has developed a WHPA program. The area in Suffolk County is in a deep recharge zone and does meet the specifications as a WHPA. Therefore, a WHPA exists within 4 miles of the site. Site sources are not within a WHPA.



Department of Environmental Conservation

PROPOSED NEW YORK STATE WELLHEAD PROTECTION PROGRAM



Submittal
to
United States Environmental Protection Agency

New York State Department of Environmental Conservation
MARIO M. CUOMO, Governor THOMAS C. JORLING, Commissioner

May 1990

Approved by EPA
a/an



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION II

JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, NEW YORK 10278

Ed Knyfd
NUS Corporation
1090 King Georges Post Road
Suite 1103
Edison, NJ 08837

Dear Mr. Knyfd:

As you requested during our telephone conversation on December 11, 1990, enclosed is a copy of New York State's Wellhead Protection Plan. The plan was approved by EPA in September of 1990.

Please note page 20 of the plan. It gives a summary of baseline wellhead protection area delineations.

If you need further assistance, you may contact me at 212-264-4124.

Sincerely,

Maureen Krudner
Maureen Krudner, Geologist
Ground Water Management Section

**PROPOSED
NEW YORK STATE
WELLHEAD PROTECTION PROGRAM**

**SUBMITTAL
TO
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
IN
APPLICATION FOR IMPLEMENTATION FUNDS**

**NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF WATER
ALBANY, NY**

MAY 1990

ACKNOWLEDGEMENTS

The New York State Department of Environmental Conservation gratefully acknowledges the assistance and recommendations of the members of the Wellhead Protection Advisory Committee. To date, these members have included the following:

- Aldo Andreoli, Suffolk County Dept. of Health Services
- Donald Beavers, Temporary Commission on Tug Hill
- Donald Bingham, U.S. Geological Survey
- Jessica Breiten, Herkimer-Oneida Planning Dept.
- James Coon, NYS Dept. of State;
- Robert Denz, Broome County Health Dept
- Hope Donovan, League of Women Voters
- John Edwards, Long Island Water Conference
- James Feuss, Cortland Co. Dept. of Health
- Robert Fickies, NYS Geological Survey
- William Gollnitz, Chautauqua Co. Health Dept.
- Bernard Gorman, Long Island Water Conference
- Nancy Jarvis, Cortland Co. Planning Dept.
- Richard Kasprowitz, NYS Dept. of Health
- Margaret Kavanaugh, Schenectady Co. Planning Dept.
- John Kent, Herkimer-Oneida Planning Dept.
- William Lee, American Water Resources Association
- Sarah Meyland, Suffolk Co. Water Authority
- Todd Miller, U.S. Geological Survey
- Jacqueline Moody, NYS Dept. of Agriculture & Markets
- James Napoli, Dutchess Co. Health Dept.
- Donald O'Dell, NYS Dept. of State
- Francis Padar, Nassau Co. Dept. of Health
- Kenneth Pokalsky, Business Council of NYS
- Keith Porter, NYS Water Resources Institute-Cornell University
- George Prolos, NYS Legislative Comm. on Water Resource Needs of L.I.
- Thomas Reamon, NYS Dept. of Health
- Joseph Salvato, American Water Works Association
- Ronald Slotkin, Broome Co. Health Dept.
- David Stern, NYS Legislative Comm. on Water Resource Needs of L.I.
- John Stonebanks, Suffolk Co. Water Authority
- Edith Tannenbaum, Long Island Regional Planning Board
- Mark Walker, NYS Water Resources Institute-Cornell University
- Patricia Walsh, Association of Towns of the State of New York
- John Williams, U.S. Geological Survey
- Donald Zizzi, Schenectady Co. Planning Dept

The original submittal (June 19, 1989) was prepared by Allan Tedrow, Kevin Roberts and James Lister of the NYS Department of Environmental Conservation, Division of Water, Groundwater Management Section. The revised document (May, 1990) was prepared by Kevin Roberts and Allan Tedrow.

The typing of this document by Barbara J. Crier, of the Department of Environmental Conservation, is also gratefully acknowledged.

PREFACE

This report represents a revision of the Proposed New York State Wellhead Protection Program, submitted to the U.S. Environmental Protection Agency on June 19, 1989. Following the June 1989 submittal, there was an additional review by the New York State Wellhead Protection Advisory Committee (see ACKNOWLEDGEMENTS) and by key program managers and regional staff of the NYS Department of Environmental Conservation. The initial comments of the USEPA concerning the submittal were received by New York in January 1990. In March 1990, the USEPA, in accordance with the provisions of the Safe Drinking Water Act amendments, notified the state that the submittal was incomplete. The revisions contained in this document primarily include many clarifications of statements made in the original document, but also include additional items to complete the original submittal (e.g., public participation summary) and items to address the adequacy concerns of USEPA.

The wellhead protection activities of the Department of Environmental Conservation in the intervening period have included further development of new source management programs (e.g., chemical bulk storage), incorporation of wellhead protection in existing programs (e.g., water supply permit program), assistance to regional planning agencies in wellhead protection

activities (e.g., 205(j) projects on source identification), regional and statewide outreach and education efforts, and providing geologic information and unconsolidated aquifer delineation information.

Most importantly, the interest of county agencies and municipal governments in New York in wellhead protection has grown considerably since the June 1989 submittal, with significant activity by key counties and municipalities in Upstate New York, by the Long Island Regional Planning Board concerning Long Island's Special Groundwater Protection Areas, and by Long Island's major water suppliers. Substantial interest in training (including delineation models and management tools), and in developing protection ordinances has been expressed.

Agencies and local government associations apart from the Department of Environmental Conservation have initiated public discussion and training activities concerning wellhead protection and groundwater management.

These activities demonstrate the desired evolution of local wellhead protection programs that the New York State Wellhead Protection Program is designed to foster.

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CHAPTER 1

WELLHEAD PROTECTION PROGRAM SUMMARY AND PURPOSE

1.1. Introduction

Responsible and effective environmental management demands careful focus on geographic areas where resource management is most needed to achieve the greatest benefit for a given level of effort. This is the overriding objective of wellhead area protection. The resource is groundwater. The benefit is reducing the risk of contamination of drinking water supply wells for the greatest number of people. The level of effort includes the cost of activities ranging from planning and assessment to the implementation and enforcement of appropriate groundwater quality protection controls at all levels of government. The issues to be evaluated and resolved include better defining the federal, state and local government partnership in groundwater protection, establishing the most rational geographic targeting and preventive management framework, and determining the optimum allocation of funds, if they become available, to achieve results.

This report is intended to satisfy the requirements of Section 1428 of the Safe Drinking Water Act in describing New York State's overall goal and plan for groundwater resource and wellhead area protection. Many important elements of wellhead area protection will evolve as local plans are designed and evaluated, especially aspects involving education, local government roles, and data collection and assessment. This submittal is intended to serve as supporting information in application for assistance funds from EPA to further develop and implement the plan. It presents the basic direction for using additional support obtained through new funding or reallocation of existing resources.

The elements of this report include the following:

- Duties of state agencies, local governments and public water supply systems (Chapter 2).
- Delineation of wellhead protection areas (Chapter 3).

- Identification of potential groundwater contamination sources (Chapter 4).
- Discussion of groundwater management approaches (Chapter 5).
- Discussion of groundwater-dependent public water system contingency planning (Chapter 6).
- Discussion of wellhead protection planning for new wells (Chapter 7).
- Discussion of public participation aspects (Chapter 8).

It is important to recognize that the proposed Wellhead Protection Program is not the first groundwater resource protection program in New York State. It does not replace the state's existing groundwater management program. Indeed, its goals and structure are already contained within that comprehensive program. This submittal refines and extends the geographic targeting framework already adopted as a principal groundwater protection policy. The basic groundwater program will continue to apply to the entire groundwater resource of the state and thus will provide a significant degree of protection for all groundwaters.

The remainder of this chapter provides additional introductory background on New York State's groundwater resources, its existing groundwater management program, and the general meaning of wellhead area protection.

1.2. Background: Groundwater and Groundwater Management in New York State

Groundwater is a critically important and uniquely vulnerable source of drinking water for over six million people in New York State, roughly one-third of the state's residents. These people draw their water from over 5,000 community wellfields or wells (serving over four million people), and more than 10,000 non-community public wells and an unknown number of private wells (serving

over two million people). In recent years, increased use of chemicals in our society has been accompanied by increasing evidence of contamination of groundwater resources. This contamination, in some cases, has been caused by chemicals of significant toxicological concern and has been sufficient to require closure or treatment of public and private water supplies.

New York State recognized the importance of groundwater resource and drinking water protection relatively early and began the development of its groundwater quality management programs in the years following World War II. Groundwater classifications and standards evolved into groundwater discharge limitations and early wellhead protection area approaches. The adoption of 83 ambient groundwater quality standards in 1978, supplemented by drinking water quality standards, coincided with the development of comprehensive groundwater protection programs. This culminated in the final publication of two major reports, the Long Island Groundwater Management Program (1986), and the Upstate New York Groundwater Management Program (1987).

These comprehensive programs form the foundation for all groundwater management efforts in the state. They encompass many major groundwater protection programs, including but not limited to solid waste, hazardous waste, pesticides, petroleum, hazardous substances, mining, and wastewater disposal and discharge. They include the activities of all relevant state agencies and form a bridge to local government activities. Most importantly, the comprehensive program reports specifically describe geographic targeting frameworks for groundwater protection that are the basis for wellhead area protection.

More recently, the New York State Water Resources Planning Council published a comprehensive New York State Water Resources Management Strategy (1989). This Strategy, prepared with major input from the New York State Departments of Environmental Conservation and Health, from local government and public representatives, and from six other state agencies, comprises 14 volumes and addresses specific issues in 13 regions of the state. It endorses the geographic targeting frameworks of the previous

Groundwater Management Program reports and supports the adoption of Watershed Rules and Regulations as a protective management approach for public water supplies.

As a general rule, wellhead area protection is a targeting approach to protect groundwater supplying specific wells. In certain cases, wellfields with multiple wells or regions with high densities of wells and complicated recharge characteristics must be considered together. Aquifer-level or aquifer segment targeting is a potentially useful approach for wellhead protection in New York because the aquifers are typically not geographically extensive (Upstate New York) or are pumped using a great number of wells (Long Island).

An important aspect of New York State's groundwater program is that all fresh groundwaters in the state are classified for best usage as a source of potable water supply (Class GA) regardless of location or current use. The comprehensive set of ambient groundwater quality standards and guidelines apply to all groundwater. These standards and guidelines (which include drinking water standards) underlie all major groundwater protection programs currently operating or under development.

New York's groundwater management programs have either already adopted or have begun to set a targeting framework that goes beyond commonly recognized wellhead area concepts. In Nassau and Suffolk counties (which share a single aquifer system on Long Island), considerable effort has been devoted to the delineation and revision of the boundaries of eight hydrogeologic zones. The Deep Flow Recharge Area (which comprises three of these zones) is considered to be the highest priority area for protecting wells in the deeper Magothy and Lloyd aquifers. Management program targeting on Long Island is keyed to these eight zones.

Additionally, nine Special Groundwater Protection Areas (SGPAs) have been delineated on Long Island and are the subject of an extensive planning effort funded in part by New York State and by the Long Island Regional Planning Board. Suffolk County has also defined "Water Supply Sensitive Areas" for protecting wells in the Glacial aquifer. The implementation of wellhead area

protection on Long Island will not replace this targeting approach. Additional geographic assessment may be included in the Wellhead Program for Long Island. It is important to emphasize that management program targeting and implementation are ultimately the most critical aspects of wellhead protection. The groundwater protection accomplishments of county-wide ordinances on Long Island must also be recognized.

In Upstate New York, unconsolidated aquifers are not as extensive as on Long Island. A considerable degree of geographic targeting has been achieved by the mapping and categorizing of Upstate aquifers. Many of these are relatively thin deposits of glacial drift in narrow valleys (less than one or two miles wide). Certain state-level programs, particularly waste management and disposal, are already strongly tied to these delineations.

The partnership between federal, state and local government is perhaps the most important part of a successful wellhead protection effort. Certain local land use control elements of a successful program are not within the state's statutory authority and are more appropriately implemented at the local level. Under the home rule provisions of New York State Law, towns, cities and villages are responsible for regulating land use. Land use controls are an important component of wellhead protection plans.

The state/local partnership is also important in adjusting protection efforts to be sensitive to local and regional differences in the groundwater resources and vulnerability, uses, programs, and local capacity for management. Local authorities in many areas of the state also have the principal authority for inspecting and testing potential contamination sources and have important roles in enforcement.

1.3. Wellhead Protection Program: Purpose and Goal

The purpose and goal of New York State's Wellhead Protection Program are to protect wellhead areas within New York State from contaminants which may have any adverse effects on the health of persons, as described in the federal Safe Drinking Water Act. This goal is

more explicitly described in the adopted New York State Groundwater Management Program as follows:

1. Protect and conserve groundwater resources for the best use as drinking water supply.
2. Emphasize problem prevention.
3. Target the groundwater program to most effectively use available program resources by focusing special emphasis on critical high-yielding aquifer systems.
4. Foster a state/local partnership.

The quantity management goal of the comprehensive program has been deleted from this list. However, the Wellhead Protection Program, essentially a quality management effort, is indirectly supportive of the quantity goal because protection of existing wells reduces the need to abandon supplies and develop new sources.

The key goal for emphasis in the Wellhead Protection Program is the third, that of geographic targeting, which has been left in the original groundwater program wording above. Part of the emphasis of the Wellhead Protection Program will be to refine and strengthen this goal.

The Wellhead Protection Program will promote targeting of staffing and funding resources and adjust program operations to achieve the maximum water quality protection benefits. Determining the optimum balance between expenditures on geographic assessment (delineation and mapping) and expenditures on improved enforcement of existing programs and development of new programs is the key challenge in developing the wellhead protection effort. This balance will differ in different areas of the state. In all areas of the state, a major need is actual program implementation and enforcement.

Wellhead protection cannot be viewed in a discrete, piecemeal fashion. The steps of delineation, source inventory and source management and control must be considered together. A scheme of very costly groundwater flow delineation analyses cannot be consistent

with the overall wellhead protection objectives if they unduly diminish funds available for management program implementation or if the management program does not require great sophistication. Increased refinements of delineations are justifiable to the extent that corresponding refinements in management and enforcement are practical and possible.

1.4. Wellhead Protection Program Summary

This summary is an overview of material developed in more detail in Chapters 2 through 8.

1.4.1. Agency Responsibilities

The Department of Environmental Conservation (DEC) is the principal agency responsible for developing and implementing state-level aspects of the Wellhead Protection Program and for coordination. The Department of Health (DOH) is responsible for certain aspects related to public water supply well data, contingency planning, new well planning, and Watershed Rules and Regulations. Regional and county planning agencies and county governments are responsible for county-level planning, management and educational outreach elements in the overall program, in addition to any county-level ordinances developed for wellhead protection. Town, village and city governments are responsible for local land use control, local ordinances and other local-level aspects of wellhead protection. Water suppliers will have a role in developing local Watershed Rules and Regulations, education, land acquisition and other program aspects determined by DEC and DOH. The educational effort will be shared by all levels, including Cooperative Extension, the universities and the State Education Department. Federal agencies and other state agencies will participate as appropriate, as coordinated by DEC with the assistance of EPA for federal agencies.

1.4.2. Wellhead Protection Area Delineation

The Safe Drinking Water Act defines a Wellhead Protection Area (WHPA) as "the surface and subsurface area surrounding a water well or wellfield, supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water well or wellfields." This definition is not specific because there is no

time framework and because there is a requirement that contaminants be reasonably likely to reach the well, a condition that is very difficult to accurately predict. States are given flexibility by the Safe Drinking Water Act in determining delineation approaches.

New York State proposes that unconsolidated aquifer boundaries serve as the fundamental delineation of wellhead protection areas and that a multiple zone approach be used within the total WHPA for varying management relative to risk. This approach is modified for Long Island and for bedrock aquifers, as described in Chapter 3. New York's approach proposes to allow local flexibility in an evolutionary process of delineation refinements, and to allow utilization of previously delineated protection areas, where appropriate.

There are many distinct advantages in this overall approach. A very important advantage is that considerable aquifer characterization and mapping work has already been accomplished. Second, it is consistent with the evolution and principal policies of both the comprehensive New York State Groundwater Management Program (1987) and New York State Water Resources Management Strategy (1989), in addition to the New York State Watershed Rules and Regulation policies. Third, it focuses attention of local governments on the entire aquifer resource and facilitates contingency planning and new (or future) well protection. Finally, it provides a base within which more sophisticated delineations (e.g., subdividing the overall WHPA) can be made as programs require and funding permits.

A possible drawback of using aquifer boundaries—that aquifers may be broad regional systems—is not a major problem in most of New York State. In Upstate New York most public water supplies using groundwater are in unconsolidated aquifers of rather limited areal extent. Most important recharge areas are within the boundaries of the unconsolidated aquifers, another advantage of this approach.

Chapter 3 provides further details and background on wellhead protection area delineation.

1.4.3. Potential Contamination Source Identification

The New York State Wellhead Protection Program proposes to use the classification of potential contamination sources based on process or operation proposed by the Office of Technology Assessment and endorsed by USEPA.

Many source inventory and identification programs are already in place or are being developed for individual groundwater protection programs. These include but are not limited to registries of hazardous waste disposal sites, petroleum storage locations, the Industrial Chemical Survey, records of the State Pollutant Discharge Elimination System (SPDES), and the hazardous material storage registry (in development). Similar information is available for other potential sources (mining, municipal waste, etc.). Other inventories (pesticides, salt storage) are needed and certain improvements (locational data, data formats) are needed in the existing registries.

The effort expended in pinpointing and mapping any possible source will be determined in balance with the effort needed to manage the most important sources. The current registries will be used as much as possible at the greatest level of geographic detail feasible within the constraints of the registry. Using these registries, some sources outside of the actual wellhead protection areas may be listed. An effort will be made to explore new formats for processing available registry data to maximize compatibility and ease of interpretation.

Chapter 4 provides further detail on potential contamination source inventory.

1.4.4. Groundwater Management Approaches

The emphasis in groundwater management efforts from the state level will be to continue to develop and implement the program recommendations made as part of the comprehensive groundwater management program, with a special focus on aspects relevant to geographic targeting of program elements.

Groundwater protection for all fresh groundwaters in New York is accomplished in the existing state regulatory programs by classifying all fresh groundwaters as potential drinking water sources, and using the stringent 6 NYCRR Part 703 groundwater standards as the management objectives statewide. Solid and hazardous waste management programs formally utilize geographic targeting as a management tool. Other state-level programs (e.g., spill response) have integrated major water supply aquifer targeting into day-to-day functions even though such targeting may not be explicitly stated in written policy.

Current and developing state-level programs will be evaluated to determine useful new approaches or cost-effective methods for targeting management practices. The needs identified will be considered in allocating available funds or staff, soliciting new funds, and in regulatory and program development.

Local governments, with the authority to regulate land use, have the capability of controlling new facilities through zoning and site plan review. Density of new development can also be controlled through zoning. Adoption of specific groundwater protection ordinances is also an avenue available to municipal and county governments, through sanitary codes or other approaches. Finally, land acquisition for groundwater protection is a viable management tool for local governments and water suppliers.

Watershed Rules and Regulations can be promulgated by the New York State Health Department following initiation and development by public water purveyors, whether municipal or privately-owned. The WHPA delineation proposals in this submittal are compatible with the models for Watershed Rules and Regulations.

The state will also use its available resources and explore new approaches for technical assistance, outreach and education to local governments to encourage participation and local initiatives. The potential for using "facilitated training", or training intermediate parties to train local groups, will be considered.

Management aspects are described in further detail in Chapter 5.

1.4.5. Contingency Planning

The existing contingency planning requirements of the New York State Department of Health's emergency planning program meet and exceed the requirements of Section 1428(a)(b) of the Safe Drinking Water Act. The existing New York program deals with all forms of water supply emergencies. In addition, the Superfund Amendments and Reauthorization Act (SARA) Title III emergency planning activities in New York support contingency planning needs for wellhead protection.

Chapter 6 further discusses contingency planning.

1.4.6. New Well Planning

The existing New York State Water Supply Permit Program enables the Department of Environmental Conservation to require, as part of the permit approval process, the adoption of a groundwater (or wellhead) protection plan for proposed new wells. The New York State Wellhead Protection Program proposes that development of such a plan be required for new wells. The plan may include Watershed Rules and Regulations, local ordinances (town, village, or city), or county ordinances. Such plans often will entail the collection of hydrogeologic information to support WHPA delineations. Such plans must be consistent with existing authorities of the water supplier and they may include intermunicipal or county-level agreements or Watershed Rules and Regulations (NYSDOH).

This aspect of the Wellhead Protection Program is further discussed in Chapter 7.

1.4.7. Public Participation

There has been substantial public participation in the evolution of these proposals, particularly in the two major planning and strategy development projects from which New York's Wellhead Protection Program was derived. The public participation in both the New York State Groundwater Management Plan and the New York State Water Resources Management Strategy fully adhered to public participation procedures.

In addition, the Wellhead Protection Program development has established a Wellhead

Protection Advisory Committee to assist in development of the submittal.

Public participation is further discussed in Chapter 8.

1.5. Evaluation of Wellhead Protection Program Progress

Program progress reports which evaluate Wellhead Protection Program development and implementation will follow one of two alternative approaches. In the event that an Assistance Agreement is adopted between EPA and DEC in accordance with the provisions of the Safe Drinking Water Act, three types of reports will be submitted to EPA which are specific to the Wellhead Protection Program and which follow the "Guidance for Applicants for State Wellhead Protection Program Funds Under the Safe Drinking Water Act" (EPA 440/6-87-011).

These are:

- a. Interim and End-of-Year Progress Reports;
- b. Biennial Status Report; and
- c. Annual Financial Status Report.

The precise content and schedule for these reports would be negotiated as part of the Assistance Agreement.

If EPA does not provide assistance and an Assistance Agreement is not established, the progress of the Wellhead Protection Program will be reported within the context of the already established procedures for reviewing the DEC Division of Water Management Plan between DEC and EPA.

CHAPTER 2

DUTIES AND RESPONSIBILITIES

2.1. Introduction

New York State's designation of the wellhead area as the highest priority area for groundwater protection is documented in New York State's Groundwater Management Program. Wellhead protection is a concept that has been utilized by a number of environmental and public health programs in New York State for decades. The passage of the 1986 Amendments of the Safe Drinking Water Act creating the Wellhead Protection Program serves as an opportunity for New York State to build on previous efforts and to foster a coherent and consistent statewide approach for a wellhead protection program through additional management efforts.

New York State's proposed Wellhead Protection Program (WHPP) has been developed from existing regulatory and management structures. Within the state there are agencies and programs at all levels of government established to regulate, enhance and manage natural resources and protect the public health. As in the State's Groundwater Management Program, it will be largely these agencies and programs that will be called upon to implement an effective WHPP.

2.2. Federal Agencies: General Responsibilities

There are two principal federal agencies with important roles and responsibilities relating to groundwater protection in New York State. These are the U.S. Environmental Protection Agency (USEPA) and the U.S. Geological Survey (USGS), a unit of the Department of Interior.

2.2.1. Environmental Protection Agency

The USEPA is the agency responsible for most of the major federal regulatory programs which provide for protection of the environment and public health. These include: the Clean Water Act (CWA), the Safe Drinking Water Act (SDWA), the Resource Conservation and Recovery Act (RCRA),

Superfund (CERCLA), the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), the Toxic Substances Control Act (TSCA), and the Clean Air Act (CAA).

EPA generally delegates many of the specific program activities to the states upon request and upon attainment of legislative requirements. This allows the state to be flexible in tailoring the program to local environmental needs (to the extent permitted by statute). EPA continues to play a role in overseeing state performance in carrying out delegated national programs which use federal grants and in supporting the states through technical expertise and research.

New York State has received delegation of programs under the Clean Water Act, the Safe Drinking Water Act, RCRA, and the Clean Air Act. The authorities in the Acts are generally mirrored by comparable state legislation, and the delegated programs have in the past decade provided essential funding support to assist strong state programs in water pollution control, public water supply regulation, air pollution control, and solid and hazardous waste management.

Not all elements of federal programs have been delegated. Examples of program activities for which USEPA maintains direct responsibility in New York include:

- Development of national drinking water quality standards (note that New York maintains a more comprehensive set of state drinking water standards);
- Designation of "sole source" aquifers under the Safe Drinking Water Act;
- Underground injection control under the Safe Drinking Water Act;
- Registration of pesticides for use under FIFRA;

• Administration of federal Superfund.

2.2.2 U.S. Geological Survey

The second federal agency with major responsibility relating to groundwater in New York State is the U.S. Geological Survey - Water Resources Division (USGS-WRD). The mission of the USGS-WRD, which is a non-regulatory agency, is to develop and disseminate scientific knowledge and understanding of the Nation's water resources. In cooperation with federal, state and local agencies, the USGS-WRD maintains an observation-well network for collection of groundwater levels and conducts interpretive investigations of the groundwater resources in New York State. The USGS-WRD maintains extensive files of groundwater data including computerized databases containing information from over 40,000 wells in the state.

The USGS-WRD will provide technical support to the Wellhead Protection Program by providing groundwater data and through cooperatively funded investigations. Wellhead protection-related investigations include regional studies of the hydrogeology and water quality of the state's aquifers and demonstration projects involving the delineation of contributing areas and sources of recharge to wellfields in selected representative hydrogeologic settings.

2.2.3. Other Federal Agencies

Several other federal agencies have indirect relationships to wellhead protection in New York. With respect to technical support, the soil information collected by the U.S. Department of Agriculture - Soil Conservation Service (SCS) may be utilized in various aspects of the program. This information is generally available in published form. Coordination between NYS and the SCS State Office in Syracuse is generally routine and direct, and no new arrangements are needed.

There is relatively little federal land in New York State outside of several military facilities. Of these, only Fort Drum in Jefferson County is a significant user of groundwater for public water supply. In such cases, the policies described in this submittal apply. The WHPA's have already

been determined according to the delineation approach in Chapter 3. General coordination with the facility will be through the Department of Environmental Conservation's Regional Office. Such coordination has been routine in the past.

For other coordination with federal agencies not related to site-specific concerns, the USEPA-Region II office (New York City) will be responsible for assisting the Central Office of the Department of Environmental Conservation in communications and issue resolution.

2.3. State Agencies: General Responsibilities

There are a variety of state agencies with interests and responsibilities relating to groundwater and wellhead protection. The two agencies with the most direct responsibilities are the Department of Environmental Conservation (DEC) and the Department of Health (DOH).

2.3.1. Department of Environmental Conservation

The DEC is the state's environmental agency, with responsibility for administering a full array of environmental quality and natural resource programs. The Department is the state's custodian for water in the environment. It is charged with the "coordinated management of water resources" (ECL Section 3-03031), the control of water pollution and the maintenance of reasonable standards of purity of the state's waters, both ground and surface (ECL Article 17). The DEC is also the agency that has been delegated authority to administer a number of EPA programs under the CWA and RCRA such as the SPDES program and the municipal and hazardous waste programs. The DEC has been designated by the Governor to be responsible for the wellhead protection elements of the Safe Drinking Water Act.

Integral elements of the Department's groundwater management and wellhead protection programs include water resources planning, issuing water supply permits, setting ambient water quality standards and classifications, water quality monitoring and surveillance, issuing municipal and industrial

wastewater discharge permits (SPDES), spill response, regulating hazardous substance and petroleum bulk storage, regulating the development, operation and maintenance of municipal wastewater facilities, and the nonpoint source management program.

Several other programs regulate important potential sources of groundwater contamination. Principal among these are programs in the areas of solid and hazardous waste (including waste facilities regulation) permitting of industrial waste transport, state Superfund (relating to hazardous waste site remediation), and hazardous waste enforcement.

Other programs which have a relationship to wellhead protection include those in the areas of pesticides and other hazardous substances regulation, mineral resources, and oil and gas regulation.

2.3.2. Department of Health

The Department of Health (DOH), under the New York State Public Health Law, is responsible for the protection of public health and more particularly, to assure a potable supply of drinking water for the state's citizens. Generally, it is responsible for water which has been withdrawn by public water suppliers for distribution to the consumer.

EPA delegated the water system supervision aspects of the Safe Drinking Water Act to the DOH in the late 1970's. The DOH implements this aspect of the SDWA through Part 5 of the State Sanitary Code. Under the Public Health Law and Part 5, the DOH inspects public water supply systems in the state to ensure proper operation and maintenance and delivery of a potable and adequate supply of water. This program includes regulation of public water supply facility design and construction; monitoring of the quality of waters delivered to the tap; inspection surveillance, and evaluation of all public water systems; emergency response to water supply systems experiencing critical water quality or quantity problems; laboratory services; establishment of state drinking water standards; and enforcement of both state and federal

drinking water standards. In addition, the DOH plays an integral role in DEC's water supply permit program through the review of water quality and plans for any needed treatment process, well construction or other improvements needed as part of the water supply permit.

The DOH evaluates available health effects data and establishes appropriate drinking water standards and guidelines.

Standards for installing on-site domestic sewage disposal systems are promulgated by the DOH with protection of public health and groundwater protection as goals.

The DOH has statutory authority for two programs which will play a significant role in the state's WHPP. These two programs are the Emergency Planning Program, and the Watershed Rules and Regulations Program.

2.3.3. Other State Agencies

Other state agencies also have roles and responsibilities which form parts of the state's current program for groundwater management and thus have a role in the state's WHPP. For example, the Department of State is responsible for many aspects related to local government, particularly training of zoning and planning board officials. The NYS Geological Survey is responsible for mapping the bedrock and surficial deposits of the state, and providing geologic advice and data to the various federal, state and local agencies concerned with protection of the state's groundwater resource. The Attorney General represents the state in cases of litigation to enforce regulatory controls and obtain clean-up by responsible parties. The New York State Soil and Water Conservation Committee provides guidance and training for managing certain nonpoint source threats. The NYS Legislative Commission on Water Resource Needs of Long Island is authorized to recommend groundwater protection approaches, new legislative or administrative actions for groundwater protection, and to investigate and evaluate water resource studies.

2.4. Regional Planning Agencies

Regional planning agencies exist in many areas of New York State, including most of the areas which contain heavily utilized aquifer systems. These agencies prepare regional plans for a variety of public purposes, and undertake planning-related studies. In many cases, their activities have included water quality management planning under Sections 208 and 205(j) of the federal Clean Water Act.

2.5. County and Local Governments

Land use controls are within the regulatory jurisdiction of local government, and are an important aspect of groundwater protection. Such land use controls may prohibit or otherwise manage activities that adversely affect wellhead areas and sensitive aquifer systems.

County agencies in many parts of New York State play an important role in assisting the administration of state-level regulatory programs, thereby effectively augmenting the effort devoted to these activities, as well as carrying out important management activities which cannot be accomplished within available state or federal resources.

2.5.1. County Government Agencies

Planning agencies and health agencies exist in most of New York State's counties.

County health agencies may administer major elements of state-level (DEC and DOH) programs for water pollution control and water supply regulation. In some cases, county health agencies also administer their own programs, resulting in a more comprehensive overall program than that administered by the state. A major example is Suffolk County on Long Island, where the County's Article 12 Program provides for comprehensive regulation of the storage and handling of toxic and hazardous chemicals.

County planning agencies are often involved in environmental or natural resource planning activities, as well as in providing expertise and technical assistance to local government on the

development and implementation of local land use controls. In many cases, these agencies can assist in tailoring environmental management activities, such as wellhead or groundwater management, to best meet local needs and conditions. They also may be able to provide an important program linkage with local government on the development and implementation of land use controls to better protect wellheads and groundwaters.

County planning boards, under the General Municipal Law (Sections 239:1, m, n), must review certain municipal zoning actions and, where the county legislative body has so authorized, subdivision plats before the municipal board can take final action. While this is a limited power (if the county planning board opposes a certain action, the municipal board needs a majority plus one of the full board to approve said action), it can serve as a tool to raise the awareness of municipalities concerning groundwater and wellhead protection.

Several counties, such as Chautauqua and Cortland, have established the position of county groundwater coordinator. This position may be located either in the County Health Department or Planning Department. The general role of the position is to serve as a focal point for all groundwater protection and related activities within the county and to provide assistance to towns and municipalities. These positions are proving to be significant positive steps in furthering groundwater protection efforts in these counties.

All counties, except those in New York City, in New York State have County Soil and Water Conservation Districts (SWCDs) as well as Cooperative Extension offices. These agencies have strong working relationships with the rural/agricultural community in the state and increasingly with local governments in urbanizing areas. The SWCDs work directly with farmers to develop farm conservation plans which include soil erosion control and nonpoint source control. SWCDs also review environmental data pertaining to soil properties, terrain, and associated watershed characteristics.

Cooperative Extension is an important vehicle for providing public education and information in rural areas. In its work with individual farmers, Cooperative Extension implements Integrated Pest Management and soil testing programs throughout the state. Where fertilizer and pesticide use in wellhead areas or over critical aquifer systems may be an issue, or where public education may be an appropriate means of addressing wellhead concerns generic to rural areas, these agencies represent important potential participants in the wellhead program.

2.5.2. Towns, Cities and Villages

Towns, cities and villages in New York State are vested under state law with responsibility for regulation of land use. Local land use controls (e.g., zoning) are not used widely at present for wellhead/groundwater protection, although a few important examples have recently emerged. In the future, however, effective local land use control powers must be an important element of management programs.

Zoning requirements which have been used for groundwater and wellhead area protection include: use restrictions; density limits; lot coverage; setbacks; special use permits; and performance standards.

In addition to zoning, municipalities also have authority for site plan and subdivision review and local ordinance adoption, all of which can play a significant role in wellhead/groundwater protection.

2.6. Public Water Supply Systems

While public water system purveyors generally do not have regulatory authority, they do have roles to play in the protection of water supply sources.

Two specific areas of responsibility fall to the water purveyor: compliance with terms of the water supply permit authorizing the taking of water (administered by DEC), and the decision to develop Watershed Rules and Regulations (which are ultimately promulgated by the State Department of Health). Water supply permits for

wells generally require the control of lands close to the well through ownership or easement.

Water purveyors also share the responsibility to educate their consumers about wellhead protection and what the consumer can do to promote groundwater and wellhead protection. It is therefore essential that the officials of public water supply systems be aware of potentially contaminating activities within their wellhead areas. It is further incumbent on these officials to identify the need for local wellhead protection programs. Without strong support by these officials, local programs may be difficult to establish.

2.7. Coordination

The Department of Environmental Conservation will have the central coordination role in the Wellhead Protection Program. Wellhead protection activities of the U.S. Environmental Protection Agency within New York State, including those related to local governments and the New York State Water Resources Institute's activities in New York State's WHPP, will be coordinated through the Department of Environmental Conservation's Wellhead Protection Program unit. The DEC's interactions with local governments will be through its existing agency structure, including both the DEC regional offices and direct coordination by the Central Office. The Department of Environmental Conservation will also be responsible for coordination with other NYS agencies and with other adjacent states concerning wellhead protection issues.

Interstate wellhead protection issues in actuality will be a rare concern in New York State. A review of public water supply well locations shows that very few systems are in the vicinity of state boundaries. In addition, there are relatively few interstate aquifer systems. The Department of Environmental Conservation will have the lead responsibility for interstate coordination, where needed. Chapter 5 further discusses this issue.

2.8. Summary

The existing institutional structure in New York State can accommodate the program activities

required to provide wellhead protection. Most of the required program elements already exist. Major new programs are not required. It is more important to provide adequate funding and carry out existing programs and responsibilities, with appropriate adjustment and targeting to provide a high level of wellhead protection. The following listing summarizes major responsibilities in wellhead protection.

SPECIFIC DUTIES IN WELLHEAD PROTECTION PROGRAM

Federal Agencies

1. Environmental Protection Agency

- Oversight and approval of WHPP's
- Technical guidance and assistance
- Funding
- Assist NYS in coordination with federal agencies

2. U.S. Geological Survey

- Development of information on groundwater resources
- Assessing utility of various technical procedures for delineating wellhead areas
- Determining usefulness of generic wellhead delineations using aquifer classification systems or other parameters

3. Other Agencies

- Implementation of NYS WHPP (as appropriate)

State Agencies

1. Department of Environmental Conservation

- Lead agency responsibility for WHPP as delegated by Governor.
- Administering the major statewide environmental protection programs which regulate potential sources of groundwater contamination.
- Installing and implementing wellhead protection concepts in environmental management programs.
- Establishing wellhead protection area delineation policies, and review of enhanced local delineations.
- Providing available records of potential contamination sources to local wellhead protection programs.
- Providing guidance for local agencies for wellhead protection area delineations and management and promoting local WHPP's.
- Reviewing and commenting on local programs.
- Funding assistance for regional and local efforts to develop wellhead programs.
- Oversight of reporting requirements and recordkeeping for Superfund Amendments and Reauthorization Act Title III data. Planning oversight is the responsibility of the State Emergency Management Office.
- Oversight of the Water Supply Permit Program for new wells, and coordination with wellhead protection.
- Coordination (local governments, other state agencies, EPA and federal agencies, other states).

- Funding USGS cooperative program to continue groundwater and wellhead information development.

- Education.
- Recommending State legislation.

Local Agencies

2. Department of Health

- Promulgating watershed rules and regulations for groundwater supplies.
- Promoting local initiatives for watershed rules and regulations.
- Administering emergency planning requirements of State Law and SDWA.
- Providing assistance for water supply programs administered by counties.

3. Department of State

- Local government interactions and training of zoning and planning officials.

4. State Geological Survey

- Miscellaneous aspects of geologic information management and assessment.

5. New York State Water Resources Institute, Cooperative Extension and State Universities

- Community and local government education.
- Research

6. New York State Soil and Water Conservation Committee

- Guidance and outreach for certain nonpoint source threats.

7. New York State Legislative Commission on Water Resource Needs of Long Island

1. Municipal Governments

- Adopting local groundwater protection ordinances (including delineation), implementing and enforcing the ordinances.
- Using zoning, site plan review, subdivision review powers to protect groundwater and wellhead areas.
- Inventorying sources of contamination, as coordinated with water supplier and other state and local agencies, and as determined by local management programs for wellhead protection.

2. County Governments

- Implementing NYSDEC and NYSDOH programs that are related to wellhead protection (as coordinated by the relevant state agency).
- Adopting ordinances to supplement existing state regulations (6 NYCRR and 10 NYCRR), as appropriate, and implementing and enforcing the ordinances.
- Providing local assistance to municipal and town governments related to wellhead protection.
- Inventorying sources of contamination, as coordinated with water supplier and other state and local agencies, and as determined by local management programs for wellhead protection.
- Educating county citizens and commercial sector concerning

groundwater and wellhead protection.

3. Regional Planning Agencies

- Promoting and supporting local wellhead protection efforts.
- Inventorying sources of contamination, as coordinated with water supplier and other state and local agencies, and as determined by local management programs for wellhead protection.

4. Public Water Supply System Purveyors

- Evaluating need for and initiating (if appropriate) adoption of watershed rules and regulations including definition of protection zones.
- Inventorying sources of contamination, as coordinated with other state and local agencies, and as determined by local management programs for wellhead protection.
- Enforcing Watershed Rules and Regulations, in coordination with relevant state and local agencies.
- Implementing conditions of water supply permits, in coordination with relevant state and local agencies.
- Complying with emergency planning requirements of DOH.
- Participating in water user and public education efforts.

CHAPTER 3

WELLHEAD PROTECTION AREA DELINEATION

3.1. Introduction and Institutional Processes

3.1.1. Introduction

The comprehensive New York State Groundwater Management Program, developed in the early 1980's and published in revised and final documents in 1986 (for Long Island) and 1987 (for Upstate), recommended key policies and program initiatives endorsing geographic targeting and critical area protection. These concepts were forerunners of the Safe Drinking Water Act's Wellhead Protection Program. Significant progress has been made in different aspects of geographic targeting of programs and in different parts of New York State. New York acknowledges these accomplishments as an integral part of its overall Wellhead Protection Program.

Delineation determines geographic areas for which different levels of groundwater protection activities are to be instituted. The Wellhead Protection Program in New York State is intended to accomplish a wider recognition of targeting objectives by all levels of government, by citizens in general, and to begin an evolutionary process toward improved targeting and protective program implementation.

The basic wellhead protection delineation approach in New York State recognizes aquifers as the fundamental geographic unit for targeting management efforts. This approach must be modified where aquifers are broad regional systems (DEC considers this case to occur only on Long Island), or where aquifers are not well characterized (considered to be the case for bedrock aquifers, in general). Elsewhere, the unconsolidated aquifers of New York tend to be of limited areal extent and they generally include the important recharge areas within their boundaries. These unconsolidated aquifers also are the source of the large majority of groundwater-derived public water supply systems.

The New York State Wellhead Protection Program proposes that unconsolidated aquifer boundaries (the land surface overlying the aquifer) serve as the baseline definition for the overall wellhead protection area (WHPA). For the baseline definition, both confined and unconfined unconsolidated aquifers are grouped together. Revisions are allowable based on site-specific evaluations. This aquifer boundary approach is proposed to be modified on Long Island and for wells in bedrock aquifers as described in Section 3.2. For all public water supply wells, specific proposed WHPA delineation policies are described in Section 3.2.

The aquifer boundary approach for the overall WHPA has several distinct advantages. It takes advantage of considerable recent and ongoing work in mapping and detailed assessments of aquifer boundaries. Incorporating this work directly into the Wellhead Protection Program provides a practical way for more effective targeting to move forward rapidly rather than being constrained by the need to perform modeling to delineate protection areas.

The aquifer approach also encompasses other non-public wells and potential future well sites, and places major focus on the high-yielding groundwater resources which are most important and most vulnerable. This last aspect is considered very important in the education component of wellhead protection, both for local officials and for the general public.

Wellhead protection area delineation is an evolutionary process. The first need for refinement is the further subdivision of the total wellhead protection area, as required for differentiated management objectives. A second area for potential refinement is delineation of the overall WHPA in the Glacial Aquifer on Long Island and in bedrock aquifers. Issues related to these topics are reviewed in both Sections 3.2 and 3.3. Flexibility for refinement or revision is very important due to the wide variability in

hydrogeologic settings, data availability, and local degree of contamination threat in New York State.

3.1.2. Institutional Processes for Overall Delineation Policies

Advisory committee and work group input into the original comprehensive Groundwater Management Program was substantial. The basic concept of geographic targeting was set forth in that program. The groups included:

- Federal Agencies (EPA, USGS)
- State Agencies (DEC, DOH, DOT, Agriculture & Markets, Energy Office, Geological Survey)
- Cornell University
- County Agencies (Health, Planning)
- Associations (Conference of Mayors, American Water Works Association, Business Council)
- Citizen Groups (NRDC, League of Women Voters)

DEC reconvened most of the original contributors into an advisory committee to assist in guiding the Wellhead Protection Program, with particular emphasis on delineation issues. Added to the original group have been:

- State Agencies (Department of State)
- County Agencies (a wider range of county participants)
- Regional Agencies and Commissions (additional planning and legislative commissions)
- Associations (Association of Towns, American Water Resources Association)

The new group, the Wellhead Protection Advisory Committee, has also included additional participation from the U.S. Geological Survey and DEC geological staff.

The delineation approach proposed in this submittal was recommended by the DEC Groundwater Management Section (responsible for developing the program) and agreed to by the Wellhead Protection Advisory Committee (members listed in front of submittal). The delineation approach directly conforms with the policies in the formally adopted Upstate New York Groundwater Management Program and Long Island Groundwater Management Program.

The DEC has also established a Memorandum of Understanding (MOU) with the DOH concerning the development of the Wellhead Protection Program. Additional MOU's will be developed as needed to institutionalize interagency working arrangements.

To support the technical needs of DEC and of local governments in carrying out and refining delineations, DEC plans to convene an ongoing Delineation Technical Workgroup consisting of geologists and groundwater management staff of DEC, DOH, State Geological Survey, USGS, and local governments. This group would consider revisions or improvements in the overall delineation approach, and would essentially be concerned with hydrogeologic aspects of the program rather than administration or contamination source control. The mission of this group is to provide recommendations to the DEC staff responsible for the overall Wellhead Protection Program. It will be convened upon EPA approval of New York State's submittal and will meet on at least a semi-annual basis or as needed.

Local authorities involved in wellhead protection may vary, as discussed elsewhere in this submittal. Therefore, uniform institutional processes at the local level will not be proposed across the entire state. Local agencies may act according to their own needs and authority. However, in all cases where Watershed Rules and Regulations are utilized as the local wellhead protection approach, the existing requirements of the New York State Department of Health (DOH) will be followed. Similarly, for all new wells, the institutional requirements of the New York State Department of Environmental Conservation's (DEC) Water Supply Permit Program will apply.

The proposed responsibility for initiating refinements of the baseline delineations described in this submittal will depend upon the regulatory approach adopted. Delineation refinements to be incorporated in Watershed Rules and Regulations approaches will be initiated and performed by water purveyors. Delineation refinements to be incorporated in county, town, village or city ordinances (including local public health ordinances) will be initiated and performed by the corresponding political authority. Delineation refinements to be incorporated in state-level regulatory programs will be performed by DEC.

In practice, most local activities will involve coordination with the State DEC and DOH. Each Department routinely reviews local activities to ensure that there are no conflicts with respect to policies and procedures and advises on the availability of technical information for delineation purposes. The overall coordination for aspects specifically related to the WHPP is the responsibility of DEC.

Other institutions, particularly the U.S. Geological Survey and Cornell and other universities, may be involved in special projects or case studies, as coordinated by DEC.

3.2. Delineation Criteria, Thresholds and Methods

3.2.1. Background - Existing Geographic Targeting

The existing, and still evolving, geographic targeting framework for groundwater protection provides a priority system for managing risks to groundwater. Following is a brief summary:

• Groundwater Classification - 6 NYCRR Part 703

Ambient water quality standards and guidelines apply to all Class GA (fresh) groundwaters. Class GA groundwaters are defined as having best use as a source of drinking water and must meet New York State's drinking water standards in addition to the ambient standards. State management programs use this framework for

protection of all fresh groundwaters in New York State.

• Unconsolidated Aquifers

Mapping of unconsolidated aquifers has progressed significantly including State-defined primary and principal aquifers which are subsets of the unconsolidated aquifers. Site-specific detailed mapping is still in progress.

Primary and principal aquifers are generally similar geologically (both are highly productive unconsolidated deposits); primary aquifers are those which have large populations using them as drinking water sources. Primary aquifers have high priority for mapping additional hydrogeologic data through the DEC/USGS cooperative program, and in special Long Island programs.

These delineations are used in the process for siting new waste disposal facilities.

• Long Island Hydrogeologic Zones

Eight hydrogeologic zones have been delineated, covering all of Long Island. Three of these together comprise the Deep Flow Recharge Area. Management program initiatives (e.g., hazardous substance storage) are based on this Deep Flow Recharge Area.

• Special Groundwater Protection Areas

Nine Special Groundwater Protection Areas have been delineated within the Deep Flow Recharge Area in both Nassau and Suffolk Counties and are currently the subject of a planning project by the Long Island Regional Planning Board.

• Other Geographic Targeting Approaches

Suffolk County has specifically defined "Water Supply Sensitive Areas" which include zones 500 feet downgradient to 1,500

feet upgradient of public wells in the Upper Glacial Aquifer.

Watershed Rules and Regulations are promulgated by the NYS Department of Health upon initiation by local water purveyors. These include delineations of protection management zones for public water supply wells. The WRR delineations do not conflict with the wellhead protection area delineation policies proposed in this submittal.

The NYS Solid Waste Management Program, in 6 NYCRR Part 360, has defined "public water supply wellhead area" as the surface and subsurface area between a public water supply well or wellfield and the 99% theoretical maximum extent of the stabilized cone of depression of that well or wellfield considering all flow system boundaries and seasonal fluctuations. New landfills are banned in these areas, in addition to all primary and principal aquifers in the Upstate area. Special provisions are defined in law for Long Island siting. As with the Watershed Rules and Regulations, there is no conflict in terminology between the Part 360 public water supply wellhead area and the overall wellhead protection area proposed in this submittal. The overall protection area includes, and is larger than, the Part 360 wellhead itself. For landfill siting, Part 360 regulations will prevail. Part 360 determinations are made only for proposed landfill siting cases.

Other setback requirements have been utilized in various state or local management programs. When used, such as for pesticides (e.g., aldicarb) or septic tanks, the setbacks apply to all wells, public or private. As with the other targeting approaches, such setbacks do not conflict with the proposed wellhead protection area policies.

Well Construction Specifications

Direct protection of the wellhead itself is achieved through adoption of construction specifications and standards. These are administered by the New York State Department of Health and follow the "Recommended Standards for Water Works" (NYS Health Department Bulletin #42, 1982). They apply to public water supply wells.

3.2.2 Wellhead Protection Area Delineation Objectives

The USEPA guidance for development of wellhead protection programs (Guidance for Applicants for State Wellhead Protection Program Assistance Funds under the Safe Drinking Water Act, EPA 440/6-87-011) contains the expectation that proposed programs will be designed to provide protection from three types of threats: direct introduction of contaminants in the immediate well area, microbial contaminants, and chemical contaminants. The first is dealt with through well construction and completion standards to be applied at the wellhead itself. The second is managed by delineating a zone to keep potential sources sufficiently distant from the well to allow die-off of the microorganisms. Establishing a minimum distance by measurement or by time-of-travel is the most common procedure for delineating areas for protection against microbial contamination.

To achieve protection against chemical contamination, EPA suggests three delineation approaches: delineation of wellfield management areas, contamination attenuation zones, or remedial action zones. Since chemicals can travel long distances, all or part of the recharge area for a well becomes the zone to be delineated for protection efforts.

The overall goals of New York State's delineation approach are essentially a combination of the wellfield management and remedial action zone goals described by EPA.

Wellfield management is used to define areas where heightened levels of protection will be

emphasized. A number of different zones may be delineated for a single water supply to provide different levels of management. The management options may range from selected land use prohibitions to specialized design specifications, enhanced facility inspections, or increased monitoring and education.

The remedial action area approach excludes high risk activities from a specifically defined zone but still allows them in more distant recharge areas. This may be refined by varying exclusions in different zones according to risk or the importance of the activity. The remedial action area concept is best applied to new or changing land uses, whereas wellfield management may be applied to existing or new land uses.

The contamination attenuation zone approach described by EPA is difficult to strictly apply due to limited capabilities to accurately predict chemical migration and persistence. In addition, the New York State groundwater standards apply to all fresh groundwaters, reducing the utility of an attenuation zone approach.

3.2.3. Delineation Policy

The underlying objective of delineation is to use different degrees of management to control risks to water supplies. The significant diversity in geological conditions, aquifer use, and in local government capabilities across New York State indicates that the approach to delineation can not be uniform and rigid for all locations.

The ideal technical goal of wellhead delineation is to have sufficient knowledge of the hydrogeology of each public water supply well or wellfield to allow precise determination of the catchment area along with accurate times-of-travel for the entire flow system. Such information is not uniformly available across the state. New information will become available unevenly as funding from various local, state and federal sources is applied to specific priority areas.

In this setting, the New York State Wellhead Protection Program proposes general recognition of high-yielding aquifers (both confined and unconfined) as the fundamental wellhead

protection area units. As described in Section 3.2.4., this policy recognizes that more targeted delineations will be necessary on Long Island because it is entirely an aquifer. Also, bedrock aquifers are not adequately characterized now to allow this approach; however, most of the major, high-yielding aquifers in New York are in unconsolidated deposits. Within the wellhead protection area, delineation of an area designated as the remedial action area is proposed, as described in Section 3.2.5.

This policy is intended to reinforce public and management program recognition of the need to protect high-yielding aquifers. It takes advantage of considerable past and ongoing work on aquifer mapping and delineation and will permit further progress in communities which have already delineated aquifer boundaries and protection areas. These communities may directly proceed to management implementation or may utilize available funds on more advanced hydrogeologic evaluations within the WHPA, depending on local needs and goals.

Within this framework, utilization of alternative delineation approaches (such as time-of-travel) is allowed and encouraged. In most cases, such alternative approaches would be applied to subdividing the WHPA within the unconsolidated aquifer boundaries for applying different levels of management. The WHPA itself would remain the area defined by aquifer boundaries. In some cases, such as for bedrock aquifers, the alternative approaches may be used to redefine the WHPA itself. The Department of Environmental Conservation will be responsible for providing guidance for such alternative approaches.

3.2.4. Wellhead Protection Area Delineations

The wellhead protection area delineation approach is summarized in Table 3.1. It recognizes that the aquifer system on Long Island and bedrock aquifers in Upstate New York must be treated differently than the unconsolidated aquifers in Upstate. The unconsolidated aquifer boundaries for the wellhead protection areas are those delineated on a series of maps titled

**TABLE 3.1.
WELLHEAD PROTECTION AREA
DELINEATION SUMMARY**

Geographic Region	Aquifer Area	Wellhead Protection Area Baseline Delineation
Long Island	Magothy & Lloyd Aquifers <hr/> Glacial Aquifer	Deep Flow Recharge Area <hr/> Simplified Variable Shape: 1,500 ft. radius upgradient 500 ft. radius downgradient
Upstate	Unconsolidated Aquifers <hr/> Bedrock Aquifers	Aquifer Boundaries (land surface) <hr/> Fixed Radius: 1,500 ft. radius

"Potential Yields of Wells in Unconsolidated Aquifers in Upstate New York" by the U.S. Geological Survey. Specifically, these maps, distributed for sale by the U.S. Geological Survey, are as follows:

1. Bugliosi, E.F., et al., 1988. Potential Yields of Wells in Unconsolidated Aquifers in Upstate New York - Lower Hudson Sheet. Water Resources Investigations Report 87-4274. U.S. Department of the Interior, Geological Survey, Albany, NY.
2. Bugliosi, E.F., et al., 1988. Potential Yields of Wells in Unconsolidated Aquifers in Upstate New York - Hudson Mohawk Sheet. Water Resources Investigations Report 87-4275. U.S. Department of the Interior, Geological Survey, Albany, NY.
3. Bugliosi, E.F., et al., 1988. Potential Yields of Wells in Unconsolidated Aquifers in Upstate New York - Adirondack Sheet. Water Resources Investigations Report 87-4276. U.S. Department of the Interior, Geological Survey, Albany, NY.
4. Miller, T.S., 1988. Unconsolidated Aquifers in Upstate New York - Finger Lakes Sheet. Water Resources Investigations Report 87-4122. U.S. Department of the Interior, Geological Survey, Albany, NY.
5. Miller, T.S., 1988. Potential Yields of Wells in Unconsolidated Aquifers in Upstate New York - Niagara Sheet. Water Resources Investigations Report 88-4076. U.S. Department of the Interior, Geological Survey, Albany, NY.

The boundaries illustrated on these maps serve as the total wellhead protection areas for public water supplies utilizing those aquifers. In certain cases, more detailed aquifer boundary maps or determinations for primary or principal aquifers (subsets of the full range of unconsolidated aquifers) have been or will be made by the U.S. Geological Survey or NYS Department of Environmental Conservation. These more detailed boundary determinations will generally supersede boundaries illustrated on the above referenced

maps as "revised" delineations of wellhead protection areas.

Both unconfined and confined unconsolidated aquifers are included on these maps and both are included in this definition of the overall wellhead protection area.

For all public water supplies utilizing groundwater, the overall wellhead protection area (WHPA) delineation will be subdivided into two parts. The innermost zone is referred to as the Remedial Action Area. The remainder of the WHPA is referred to as the Wellfield Management Area. The terminology is derived from the EPA guidance referenced earlier. Depending on local management objectives for groundwater protection, local hydrogeology, and data availability and resource availability, the Wellfield Management Area may be further subdivided. This further subdivision of the Wellfield Management Area would be considered a refinement of the "baseline" delineation. Methodologies, criteria and thresholds used for such revisions are flexible. Approaches proposed by local water purveyors will be evaluated and approved or disapproved upon submittal to the New York State Department of Environmental Conservation.

The term "baseline" delineation, as used in this submittal, is intended to represent the initial WHPA delineation advocated by the Department of Environmental Conservation. The delineation may be directly utilized in implementing management activities for groundwater protection. However, if site-specific conditions suggest that alternative delineations are appropriate (including the further subdivision of the Wellfield Management Area already cited), those delineations may be accepted by the Department of Environmental Conservation. The evolution of improved delineation techniques, the growing availability of hydrogeologic information, and the longer-term enhancements of groundwater protection programs may lead to a redefinition of the baseline delineations by the Department of Environmental Conservation.

These baseline delineations apply to public water supply wells. Applicants for new public water supply wells may be required to perform

alternative site-specific delineations according to conditions stipulated through the Water Supply Permit Program (refer to Chapter 7).

The proposed WHPA delineations are described according to the following geographic and hydrogeologic settings. They are also summarized in Table 3.1.

• Unconsolidated Aquifers - Upstate New York

1. WHPA Definition:

The boundaries of wellhead protection areas for public water supplies in unconsolidated aquifers in Upstate New York are the land surface boundaries of the aquifers as illustrated on the five-aquifer sheet maps for Upstate published and distributed by the U.S. Geological Survey (see earlier reference). These boundaries may be revised in accordance with more detailed primary and principal aquifer maps and boundary determinations as approved by the Department of Environmental Conservation. The maps provide definition for both unconfined and confined aquifers. Revisions of these boundaries may be made, pending approval by the Department of Environmental Conservation.

2. Rationale:

The delineations proposed above are hydrogeologically-based and are consistent with the policies and goals of the Upstate Groundwater Management Program already adopted and certified by the Governor of New York as an element of the New York State Water Quality Management Plan.

3. Mapping and Case Studies:

Mapping of these areas is already completed and published. Case studies are not considered appropriate, as the maps have been reviewed and approved by the U.S. Geological Survey and the Department of Environmental Conservation as part of the publication process.

4. Public Water Supply Significance:

The large majority of public water supplies using groundwater, particularly for municipal and community systems, are located in unconsolidated aquifers. It is expected that a significant proportion of additional future supplies will also tap these systems.

• Bedrock Aquifers - Upstate New York

1. WHPA Definition:

The baseline boundaries of wellhead protection areas for public water supplies in bedrock aquifers are fixed radius areas with a radius of 1,500 feet from the wellhead. Revisions based on site-specific information are desirable, with the goals being to identify and delineate principal recharge areas. Revisions may be developed, pending approval by the Department of Environmental Conservation.

2. Rationale:

The fixed radius approach for the initial WHPA is not based on estimated times-of-travel or drawdown. It provides a substantial increase in protection over more commonly existing protection zones (typically 100 feet or 200 feet). The principal rationale is that the baseline delineation gives a basis for immediate action on wellfield management without requiring expensive site-specific delineations. Revisions based on local conditions are encouraged, particularly for municipal community systems, of which there are relatively few in the State. The geographic targeting benefits of uniformly delineating substantially larger fixed radius areas for all bedrock wells are very questionable. Many of the bedrock public water supply wells are among the approximately 10,000 non-community public wells (e.g., isolated public buildings, roadside rest areas, etc.). There will be little geographic targeting advantage for groundwater protection programs if

numerous 3 to 12 square mile WHPA's (1-2 mile radius) for non-community wells intersect or nearly intersect across the State. It must be recognized that all fresh groundwaters in bedrock aquifers are classified as GA groundwaters and thus are already protected by substantial statewide protection programs which use rigorous ambient water quality standards in their design.

3. Mapping and Case Studies:

Mapping will be performed according to the phasing priorities described in Section 3.3. Case studies of fixed radius approaches are not considered to be of significant benefit. As proposals for revisions based on alternative approaches are submitted to the Department of Environmental Conservation, they will be evaluated for potential use as models for comparable hydrogeologic conditions.

4. Public Water Supply Significance:

Relatively few municipal community systems utilize bedrock aquifers in New York State and those that do are generally with low population dependence. Public water supplies in bedrock aquifers are typically non-community wells serving small numbers of people.

◀ Magothy and Lloyd Aquifers - Long Island

1. WHPA Definition:

The boundaries of the wellhead protection area for public water supplies using the Magothy and Lloyd aquifers are the boundaries of the Deep Flow Recharge Area as recognized by the Department of Environmental Conservation. Refinements within the overall WHPA may include further definition of Wellfield Management Areas, pending approval by the Department of Environmental Conservation.

2. Rationale:

The Deep Flow Recharge Area was determined to be the most important overall groundwater protection area for wells in the Magothy and Lloyd aquifers in the Long Island Groundwater Management Program already adopted and certified by the Governor of New York as an element of the New York State Water Quality Management Program. The delineations have also been adopted in the Suffolk County Sanitary Code.

3. Mapping and Case Studies:

Mapping of the Deep Flow Recharge Area is already completed. Additional case studies are not considered appropriate.

4. Public Water Supply Significance:

Most public water in Nassau County is withdrawn from the Magothy aquifer. The majority of public water supplies in Suffolk County are also withdrawn from the Magothy aquifer. Of those public water supplies in Suffolk County utilizing the Glacial aquifer, approximately half are located within the Deep Flow Recharge Area. Thus, these wells are included within the overall wellhead protection area for the deeper aquifers.

◀ Glacial Aquifer - Long Island

1. WHPA Definition:

The boundaries of the wellhead protection area for public water supplies using the Glacial aquifer are defined as a fixed variable shape zone with a fixed radius in the upgradient groundwater flow direction of 1,500 feet and a fixed radius in the downgradient direction of 500 feet. Revisions may be made, pending approval by the Department of Environmental Conservation.

2. Rationale:

Fixed-shape zones are not based on calculated time-of-travel or drawdown. The proposed definition is consistent with Water Supply Sensitive Areas already delineated by Suffolk County (which contains nearly all of the Glacial wells on Long Island) and for which enhanced protection programs have already been implemented in the Suffolk County Sanitary Code. Approximately half of the Glacial wells are within the Deep Flow Recharge Area and are thus protected within a larger overall WHPA. Significant expansion of the WHPA for all Glacial wells may not provide any reasonable geographic targeting benefits, as most of the WHPA's would intersect or nearly intersect. All fresh groundwaters in the Glacial aquifer are already covered by substantial protection programs which utilize a rigorous set of ambient water quality standards.

3. Mapping and Case Studies:

Mapping of the WHPA's for Glacial wells in Suffolk County has been completed through the Water Supply Sensitive Area delineations. For the relatively few Glacial wells in Nassau County, mapping will be completed according to the phasing priorities described in Section 3.3. Case studies of fixed-shape delineations are not considered to be of significant benefit. As proposals for revisions based on alternative approaches are submitted to the Department of Environmental Conservation, they will be evaluated for potential use as models for other Glacial well delineations.

4. Public Water Supply Significance:

As stated previously, approximately one-fourth of the public water supplies in Suffolk County are based in Glacial wells that are outside of the Deep Flow Recharge Area. If Nassau County is included, only about one-eighth of the water supply dependency is from Glacial wells outside of the Deep Flow Recharge Area.

3.2.5. Remedial Action Areas

For all community public water supply wells, regardless of setting, a remedial action area will be delineated within the WHPA. For those supply wells, the proposed baseline delineation of this area will be a fixed radius zone of 200 feet radius from the well. Revisions may be made after evaluation by the Department of Environmental Conservation. For non-community public water supply wells (e.g., isolated public buildings, etc.), the existing New York State Department of Health standards for well separations (e.g., from waste disposal facilities) are to be followed.

The rationale for this baseline delineation is based upon general observations in the past that such a zone has been adequate for protection against microbiological contamination. An alternative time-of-travel basis for delineating revised remedial action area boundaries would be to use a time-of-travel from a minimum of 60-days up to one year. The 60-day period has been used in New York State and in many European countries (USEPA, EPA 440/6-87-010, Guidelines for Delineation of Wellhead Protection Areas). A one-year period is considered conservative. In certain cases, the site-specific hydrogeology (e.g., confined aquifer conditions or long times-of-travel) and the nature of existing land uses and management options may allow remedial action areas smaller than 200 feet radius.

3.2.6. Potential Refinements and Summary

Table 3.1 summarizes the baseline delineations for wellhead protection areas.

Refinements may include:

- Subdivision of the Wellfield Management Area portion of the WHPA, to allow application of different levels of management within the WHPA.
- Revision of the Remedial Action Area portion of the WHPA, according to alternative methods, including time-of-travel or drawdown analysis.

- Revised boundary determinations of the unconsolidated aquifers in Upstate, including primary and principal aquifers, or of the Deep Flow Recharge Area on Long Island.
 - Alternative hydrogeologic determinations of appropriate WHPA's in bedrock aquifers or for wells in the Glacial aquifer on Long Island.
- bedrock wells and Glacial wells will be performed as resources permit.

3.3. Phasing Considerations

The published unconsolidated aquifer maps cited in the previous section complete the baseline WHPA delineations for all public water supply wells within those aquifers. The completed delineation of the Deep Flow Recharge Area on Long Island has been defined according to road boundaries. That delineation defines the WHPA for all public water supply wells in the Magothy and Lloyd aquifers. The baseline WHPA boundaries for public water supply wells using the Glacial aquifer in Suffolk County have been determined by the Suffolk County Department of Health Services through its Water Supply Sensitive Area designations.

The remaining baseline WHPA boundary determinations that are needed consist of a relatively small set of Glacial aquifer wells and public water supply wells in bedrock aquifers. The phasing priorities for these groups are, in order:

1. Municipal community wells
2. Non-municipal community wells
3. Non-community public wells

Within each priority group additional phasing may be generally ordered by population dependency with modifications made if there are significant known or suspected threats to the wells.

It is emphasized that the baseline WHPA delineations for the very large majority of public water supply wells (by population served) are completed. The delineations for the remaining

CHAPTER 4

SOURCE IDENTIFICATION

4.1. Categories of Potential Groundwater Contamination Sources

4.1.1. Introduction

Potential contamination sources as described in the federal Safe Drinking Water Act include those anthropogenic sources, both point and nonpoint, which involve the manufacture, use, storage, handling, transport, or disposal of toxic and hazardous substances which may have any adverse effect on human health. Certain activities (e.g., mining) may also be considered potential sources, because they may increase vulnerability to contamination and may be associated with other activities of concern.

In the broadest sense, potential contamination sources may include nearly all commercial, and many governmental and domestic activities. To be useful in guiding the management of contamination sources to maximize groundwater protection benefits, some differentiation or priority system is needed.

Priorities are based on the significance of the source and the intended management application of the inventory. Source significance is based on the type of contaminant (mobility in groundwater, known impacts on public water supplies, toxicology, pathogenicity), the quantity of the contaminant at that location, and the potential of that source type to release contaminants to groundwater and impact water supplies.

The management applications of the source inventory may include:

- Developing local awareness and support for groundwater protection program adoption;
- Emergency response planning;
- Inspection planning or sequencing;
- Monitoring design;

- Enforcement; tracking compliance;
- Targeting education efforts;
- Regional and local planning;
- Local land use regulations development; and
- Identifying new program or program improvement needs.

4.1.2. Classification of Sources

Potential contamination sources may be classified in many ways. The major need for groundwater protection is to provide a structure for collecting and interpreting data regarding existing contamination sources which is readily useable in a variety of programs.

The United States Office of Technology Assistance developed a comprehensive listing of potential contamination sources, including 33 types within six major groups (Table 4.1). This classification has been included in wellhead protection program guidance manuals prepared by USEPA. All of these source types occur within New York State, although mine tailings, mine waste and mine drainage are less important than in many other states. Mining (e.g., sand and gravel) is still considered to be a potential source in that it may be associated with other activities (fuel usage) that can contaminate groundwater.

The OTA classification in Table 4.1 is endorsed by the Department of Environmental Conservation as a useful structure for collecting data related to potential contamination sources.

A long-term goal of contamination source inventory is to utilize computer geographic information systems (GIS) to manage and interpret the data collected. The mapping keys of GIS methods or other maps will not be required to explicitly duplicate the OTS classification, as this would be counterproductive if more efficient

TABLE 4.1
SOURCES OF GROUNDWATER CONTAMINATION

<p>CATEGORY 1: <u>Sources Designed To Discharge Substances</u></p> <ul style="list-style-type: none"> - Subsurface percolation (e.g., septic tanks and cesspools) - Injection wells <ul style="list-style-type: none"> . Hazardous waste . Non-hazardous waste (e.g., brine disposal and drainage) . Non-waste (e.g., enhanced recovery, artificial recharge solution mining and in-situ mining) - Land application <ul style="list-style-type: none"> . Wastewater (e.g., spray irrigation) . Wastewater by-products (e.g., sludge) . Hazardous waste . Non-hazardous waste <p>CATEGORY 2: <u>Sources Designated to Store, Treat, and/or Dispose of Substances; Discharge Through Unplanned Release</u></p> <ul style="list-style-type: none"> - Landfills <ul style="list-style-type: none"> . Industrial hazardous waste . Industrial non-hazardous waste . Municipal Sanitary - Open dumps, including illegal dumping (waste) - Residential (or local) disposal (waste) - Surface impoundments <ul style="list-style-type: none"> . Hazardous waste . Non-hazardous waste 	<ul style="list-style-type: none"> - Waste tailings - Waste piles <ul style="list-style-type: none"> . Hazardous waste . Non-hazardous waste - Materials stockpiles (salt, coal, etc.) - Graveyards - Animal burial - Aboveground storage tanks <ul style="list-style-type: none"> . Hazardous waste . Non-hazardous waste . Non-waste (petroleum, etc.) - Underground storage tanks <ul style="list-style-type: none"> . Hazardous waste . Non-hazardous waste . Non-waste (petroleum, etc.) - Containers <ul style="list-style-type: none"> . Hazardous waste . Non-hazardous waste . Non-waste - Open burning and detonation sites - Radioactive disposal sites <p>CATEGORY 3: <u>Sources Designed to Retain Substances During Transport or Transmission</u></p> <ul style="list-style-type: none"> - Pipelines <ul style="list-style-type: none"> . Hazardous waste . Non-hazardous waste . Non-waste (petroleum, etc.)
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SOURCE: Office of Technology Assessment, Protecting the Nation's Groundwater from Contamination, October 1984.

TABLE 4.1
SOURCES OF GROUNDWATER CONTAMINATION
(Continued)

<ul style="list-style-type: none"> - Materials transport and transfer operations <ul style="list-style-type: none"> . Hazardous waste . Non-hazardous waste . Non-waste (petroleum, etc.) 	<ul style="list-style-type: none"> - Other wells (non-waste) <ul style="list-style-type: none"> . Monitoring wells . Exploration wells - Construction excavation
<p>CATEGORY 4: <u>Sources Discharging Substances as a Consequence of Other Planned Activities</u></p> <ul style="list-style-type: none"> - Irrigation practices (e.g., return flow) - Pesticide applications - Fertilizer applications - De-icing salts applications - Urban runoff - Percolation of atmospheric pollutants - Mining and mine drainage <ul style="list-style-type: none"> . Surface mine-related . Underground mine-related 	<p>CATEGORY 6: <u>Naturally occurring Sources Whose Discharge Is Created and/or Exacerbated by Human Activity</u></p> <ul style="list-style-type: none"> - Groundwater-surface water interactions - Natural leaching - Saltwater intrusion/brackish water upconing (or intrusion of other poor quality natural water)
<p>CATEGORY 5: <u>Sources Providing Conduit or Inducing Discharge Through Altered Flow Patterns</u></p> <ul style="list-style-type: none"> - Production wells <ul style="list-style-type: none"> . Oil (and gas) wells . Geothermal and heat recovery wells . Water supply wells 	

SOURCE: Office of Technology Assessment, Protecting the Nation's Groundwater from Contamination, October 1984.

keys are developed. However, the goal of all acceptable source inventory approaches will be to include the categories in the OTS listing.

4.2. Contamination Source Inventory Procedures

Mapping of sources should use a minimum base map scale of 1:24,000 for printed map or map overlays. The use of alternative larger scale base maps which enable more precise locations (e.g., tax maps) should be considered on a case-by-case basis. GIS methods may be accepted, pending approval by the Department of Environmental Conservation.

Extensive source-related data systems and registries for the most important potential contamination sources already exist in New York State. However, these vary in design and geographic specificity. These important data systems include, but are not limited to:

- Groundwater discharge permits
- Industrial Chemical Survey: Locations of continuation usage, handling and storage of industrial and toxic chemicals
- Underground Injection Control (UIC) Program data, especially UIC Class V wells (USEPA program)
- Emergency management and response data, including the Superfund Amendments Reauthorization Act (SARA) Title III data
- Solid waste facility locations
- Hazardous waste site locations (inactive and active)
- Hazardous waste generators
- Mining operation locations
- Oil and gas production locations
- Petroleum storage locations
- Petroleum and chemical spill or leak locations

- Hazardous substance storage locations
- Radioactive waste storage locations

The recommended procedure for contamination source inventory is as follows:

1. The lead responsible local authority obtains the location data for the major categories listed above with the assistance of DEC and other local, state and federal agencies. The lead responsibility is determined by the intended management approach (e.g., county agency if county ordinances are intended, town officials if town ordinances are intended, water purveyor if Watershed Rules and Regulations are intended, etc.).
2. Lead responsible local authority collects available information on other categories of sources listed in the OTS classification in Table 4.1.
3. General field survey performed to confirm or revise collected information and to fill in information gaps.
4. If used, GIS mapping methods are coordinated with DEC to ensure compatibility.
5. If GIS methods are not directly used, hard copy maps are prepared on a 1:24,000 scale or larger.

Baseline wellhead protection areas have already been determined by the policies described in Chapter 3. In certain cases, where a locality has further subdivided the overall wellhead protection area into higher priority and lower priority areas, source inventory activities may be phased to focus on the higher priority area. Contamination source inventories should generally follow delineation activities to focus those efforts. The inventory stage may collect information from areas larger than the WHPA itself, depending on the geographic specificity of the available data bases cited above.

The general priorities for source inventory, if phasing is necessary, should be to focus on waste disposal sites, petroleum storage sites,

hazardous/toxic substance usage, storage and handling locations first, as most known public water supply well contaminations have been related to these sources. Out of the wide array of hazardous substance locations, first priority should be given to the chlorinated solvents, because these are the most common type of public water supply well contamination. Alternatively, higher priorities may be placed on inventorying sources of chemicals included in the New York State drinking water quality standard category known as "Principal Organic Contaminants" (10 NYCRR Part 5), which includes the chlorinated solvents and other high priority chemicals of concern to public water supplies.

4.3. Completion, Refinement and Update of Contamination Source Inventory

A major goal of source inventory is to support the needs of a groundwater protection management program. Therefore, the ideal completion target for source inventory is prior to adoption or promulgation of groundwater protection ordinances or Watershed Rules and Regulations. The initial results of source inventory should be assessed prior to drafting such ordinances.

In some cases, as in complex commercial or industrial areas, phasing of source inventory activities will be necessary. The first level should be identifying industrial or commercial zones. More detailed phases may categorize the industrial or commercial land uses. The ideal, exhaustive inventory of all specific sources may not ultimately reside within a wellhead protection program data base. Rather, the most detailed data bases will reside with the appropriate regulatory program (e.g., petroleum bulk storage registry, etc.). Unnecessary duplication of efforts should be avoided.

The adoption of GIS mapping procedures will allow continuous updating of the source inventory. In the absence of GIS capabilities, printed or overlay updates will be completed at least every five years. Management program staff at the local and state level ordinarily maintain continuously updated files regarding regulated sources of contamination.

The Department of Environmental Conservation has initiated systematic inventories for several areas of the state by contracting with regional planning and development boards or councils utilizing Clean Water Act, Section 205(j)(5) pass-through funds. In eight different regions, the boards have selected municipal water supply systems and are inventorying contamination threats generally within a mile of the wells. This will be a beginning for a statewide system with some of the boards preparing their information in a GIS format as well as on 1:24000 maps.

For Nassau and Suffolk Counties on Long Island, Region 1 staff of DEC has been participating in a GIS user's group, comprised of representatives of federal, state, county, and local agencies. The group is building a shared data system which will result in an inventory of many groundwater contamination threats and of known groundwater quality problem areas in relation to public water supply wells. Additionally, the Long Island Regional Planning Board, in conjunction with other local agencies, is assessing major threats to groundwater as part of a comprehensive planning project for nine Special Groundwater Protection Areas covering large areas of Long Island.

CHAPTER 5

SOURCE MANAGEMENT

5.1. Introduction

Water resource protection programs in New York State have a long history. It was largely within the structure of New York State's existing programs and institutions that the state's groundwater management program was developed and it is within this structure that the Wellhead Protection Program will evolve. Adequate authorities and mechanisms for the Wellhead Protection Program already exist in New York State. There is not a need to modify existing legislation or regulations. The principal needs are for local governments (including counties) to obtain staff resources to further implement protection activities. Adoption of local ordinances may be needed as well as support from the state through technical assistance, financial assistance and training.

The foundation of nearly all groundwater protection programs is New York's stringent sets of standards and guidelines for ambient groundwater quality and drinking water quality. The standards themselves include broad classes of compounds, substantially reducing the possibility of unforeseen problems and the need for their revision. The availability of guidelines as a tool enables quick response to concerns with new substances. All fresh groundwaters in New York State are classified as potential sources of drinking water and are protected through statewide application of programs designed to prevent degradation with respect to these stringent standards. Anti-degradation goals are applied to all groundwater. It is important to recognize that groundwaters outside of wellhead protection areas are not left unprotected.

New York State has already adopted stringent protection programs for the most important categories of potential contamination sources. Certain nonpoint source categories are not directly controlled through specific state-level regulatory oversight (e.g., fertilizer applications, road salt applications). However, for these

source categories (and any source category) any harm (e.g., contamination) is actionable through "public nuisance", a long standing common law doctrine in New York State. Liability, therefore, does exist even for sources not directly regulated. In these cases, best management practices (BMPs) and other tools may be more viable than direct regulation. The New York State Nonpoint Source Management Program, a new effort, is designed to address these needs.

A complete identification and evaluation of all existing federal, state and local source management programs that have bearing on groundwater protection or potential contamination sources is far beyond the scope of this submittal or of any single work. Rather, major programs are briefly summarized in Section 5.2. Section 5.3. summarizes future source management considerations and management coordination.

5.2. Existing Source Control Programs

5.2.1. Federal Agencies

The USEPA is responsible for most of the major federal regulatory control programs for groundwater protection. These programs are given authority under the Clean Water Act (CWA), the Safe Drinking Water Act (SDWA), the Resource Conservation and Recovery Act (RCRA), Superfund (CERCLA), the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), and the Toxic Substances Control Act (TSCA). An overview of the coverage of these Acts is provided in Table 5.1.

EPA policy in administering these programs is generally to delegate many of the specific program activities to the states upon request and upon attainment of legislative requirements; to provide flexibility for states to tailor the programs to most effectively meet environmental needs within each state, to the extent permitted by statute; to oversee state performance in carrying out delegated national programs which use

Table 5.1

**OVERVIEW OF USEPA STATUTORY AUTHORITY
RELATING TO GROUNDWATER**

Clean Water Act	Principal regulatory programs focus primarily on surface water. The Act contains only general references to groundwater. However, the Act provides major sources of funding for state water pollution control programs.
Safe Drinking Water Act	Authorizes EPA to set maximum contaminant levels and monitoring requirements for public water systems; provides for regulation of underground injection wells to protect drinking water aquifers; provides for designation of "sole source" drinking water aquifers; provides source of funding for state programs of public water supply regulation. Authorizes states to develop Wellhead Protection Programs.
Resource Conservation and Recovery Act	Provides for establishment of standards for hazardous waste treatment, storage, and disposal facilities; and requirements for ensuring that land disposal of solids or hazardous waste protects groundwater. Establishes the Federal Underground Storage Tank Program.
Superfund (Comprehensive Environmental Response Compensation, and Liability Act of 1980)	Creates a trust fund to provide for emergency clean-up of chemical spills or hazardous waste dumps for which no responsible party can be immediately found. Trust fund money is derived from taxes on oil and 42 other specific chemical compounds.
Toxic Substances Control Act	Authorizes EPA to restrict or prohibit the manufacture, distribution, or use of products which may adversely affect the environment.
FIFRA (Federal Insecticide, Fungicide and Rodenticide Act)	Gives EPA the responsibility to control the use of pesticides; specifically, EPA is responsible for registering, canceling, suspending, or changing the classification of individual pesticides for use, and considering a broad range of environmental impacts including impacts as groundwater.

federal grants; and to support the states through provision of technical expertise and research. The Underground Injection Control (UIC) program, a program not delegated to New York State, may benefit the Wellhead Protection Program through inventory activities, particularly for existing UIC Class V wells.

The DOH must also approve the subdivision of land when more than 4 new lots are created within a three-year time period and when the lots are smaller than 5 acres each. Through this review process, development within a protection zone of a public water supply well is strictly controlled or prohibited.

5.2.2 State Agencies

The two state agencies with the major responsibility for managing potential threats to groundwater are the Department of Environmental Conservation (DEC) and the Department of Health (DOH).

DEPARTMENT OF ENVIRONMENTAL CONSERVATION

The DEC is responsible for administering a full array of environmental programs to be used in implementing the Wellhead Protection Program. An overview of these programs follows:

SPDES

The New York State Pollutant Discharge Elimination System (SPDES) is a program for the issuance of permits and regulatory control of discharges of appropriately treated sanitary, industrial, or commercial wastewater into the surface or groundwaters of the state. It is a comprehensive program for protecting water quality encompassing effluent limitations, monitoring requirements, and, for existing discharges not yet meeting effluent limitations, a schedule for achieving compliance. The SPDES Program is authorized by Article 17, Title 8 of the New York State Environmental Conservation Law (ECL) as amended in 1973. All groundwater discharges must

be permitted with the exception of those which are less than 1,000 gallons per day and are composed entirely of domestic wastewater.

Petroleum Bulk Storage

In effect since December 1985, the program regulates the storage and handling of petroleum. Major provisions of the program include registration of all stationary tanks over 1,100 gallons that store petroleum; establishment of standards for retrofitting; operation and closure of existing facilities; and establishment of standards for new and substantially modified petroleum facilities. The program is authorized by Article 17, Title 10 of the ECL.

Hazardous Substance Storage and Handling (Chemical Bulk Storage)

Phase I of the program (effective July 15, 1988) and Phase II (expected to be effective during 1991) will regulate the storage and handling of hazardous substances. Phase I requires the registration of all underground tanks and those aboveground stationary tanks storing 185 gallons (750 kilograms) or greater. Phase II will regulate the storage and handling of hazardous substances and include standards for dikes, piping systems, vents, transfer stations, monitoring, inventory record keeping, closure, container storage and the storage of bulk solids. The program is authorized under Articles 37 and 40 of the ECL.

Spill Response

The program, started in 1978, is designed to protect both public health and the environment from the effects of petroleum and chemical spills and leaks. Major components of the program include reporting requirements, a 24-hour hotline telephone/response network, on-site response by regional staff, stand-by

clean-up contractors, a data management system, and coordination with the other public agencies. The program also provides assistance to local governments in emergency planning related to spills and leaks and monitors compliance with Superfund Amendments and Reauthorization Act Title III requirements. The Department maintains geotechnical services to assist the program, both in the central office and in regional offices. The program is authorized by Article 12 of the Navigation Law.

• Water Supply Permits

The Water Supply Permit Program, also discussed in Chapter 7, is primarily a quantity management program. However, it indirectly controls potential contamination sources by controlling the influences on groundwater flow. The most important is the control on intrusion of naturally-occurring saline groundwater. The program is authorized by the ECL Article 15, Title 15 and is regulated under 6 NYCRR Parts 601 and 602.

• Flood Plain Management

The program, which is consistent with the Natural Flood Insurance Program, includes performance standards for water supply systems. Water systems within the 100-year flood plain are required to be designed to minimize or eliminate infiltration of flood waters into the systems. Over 1,350 cities, towns and villages in New York State have adopted local laws containing the federal standards for flood protection of water supply systems. In addition, the state flood plain regulations (6 NYCRR Part 500) are applicable within 136 towns and villages. The New York State Flood Plain Management Program maintains an outreach and education effort to assist local governments in implementing flood protection, including water supply protection. The program is authorized by ECL Article 36.

• Municipal Solid Waste

The program regulates the collection, transport, processing, incineration and ultimate disposal of municipal solid waste. Pertinent landfill requirements include: limitations on acceptance of hazardous waste; geological siting standards, including a minimum vertical separation between the base of the constructed landfill liner and groundwater of five feet and between the base of the constructed landfill liner and bedrock of ten feet; environmental monitoring of facilities; engineering standards, including design provisions for impermeable liners and leachate collection systems to restrict subsurface migration of contaminants and closure provisions for low permeability caps to minimize infiltration in the waste mass and subsequent leachate generation; and hydrogeologic siting restrictions on new landfills and landfill expansions including prohibitions within public water supply wellhead areas and primary and principal aquifers. The program is authorized by the ECL, Article 27.

• Hazardous Waste Management

The program regulates the entire scope of industrial and commercial hazardous waste management. Hazardous wastes are identified, regulated at the point of generation, tracked in transport from generation to point of ultimate disposal, and regulated with regard to treatment, storage and disposal. The siting of new facilities for off-site treatment, storage and disposal (i.e., those facilities receiving hazardous waste from other facilities) must conform to stringent siting requirements in accordance with 6 NYCRR Part 361. The overall program is authorized by the ECL, Articles 19, 23 and 27.

Hazardous Waste Remediation

The program deals with the problems associated with inactive hazardous waste sites. The three major aspects of the program include identifying, evaluating and remediating hazardous waste sites. The 1986 Environmental Quality Bond Act provided the program with access to \$1.2 billion for remediation costs. The program is authorized by the ECL, Article 27, Title 13.

Low Level Radioactive Wastes

The program develops and implements low-level radioactive waste regulations, reviews permit applications for radioactive waste discharges, issues permits for transporters of low-level radioactive waste, provides technical support on low-level radioactive waste and assists in the siting of a low-level radioactive waste disposal facility. The program is also responsible for oversight of ground and surface water quality at extant disposal sites such as West Valley, New York, and potential new sites such as the proposed low-level radioactive disposal facility. The existing siting regulations ban new sites overlying primary and principal aquifers and require evaluation of potential groundwater impacts in all other areas. The program is authorized by the ECL, Articles 27 and 29.

Pesticides

Under the state program, pesticides must be registered, and a permit is required for the distribution, sale, or offer-for-sale of "restricted use" pesticides, as defined by DEC. A permit is also required for the purchase, possession, or use of these products, and all applicators must be certified. The primary emphasis of the program is on the certification of pesticide users and on issuing permits to distributors of "restricted use" products. Nearly all pesticides registered in New York State have been previously

registered by EPA. The existing registration procedure in New York State relies heavily on EPA review, supplemented by additional state DEC and DOH review. The USEPA's pesticide registration procedures include the evaluation of a variety of chemical characteristics, such as water solubility and chemical persistence, relating to potential leaching to groundwaters. The New York State program is authorized by the ECL, Articles 15 and 33.

Mineral Resource Extraction

The DEC administers New York State's Mined Land Reclamation Program under Article 23, Title 27 of the ECL. The program involves the permitting of all mining operations in the state from which more than 1,000 tons of mineral are extracted within twelve successive calendar months. DEC's rules and regulations require the preparation and filing of plans and, through the process of an application review and field inspection, the determination that the mining operation will be conducted in an environmentally sound manner and that upon completion of mining, the affected land will be returned to a condition which encourages future productive use. Provisions for protection of ground and surface waters from potential adverse impacts of mining activity are included within the program.

Oil and Gas Program

The program regulates the drilling, operation, and plugging and abandonment of oil, natural gas, underground gas storage, solution salt mining, brine disposal, geothermal and stratigraphic wells. Pertinent parts of the program include inspections of operations and facilities; financial security requirements that ensure availability of funds for well plugging and surface restoration costs; well construction and plugging requirements; drilling,

completion and production requirements; and the imposition of supplementary permit conditions for all drilling in primary and principal aquifers and other environmentally sensitive areas. The program is authorized under the ECL, Article 23.

DEPARTMENT OF HEALTH

The New York State Department of Health is responsible for the protection of public health and assuring provision of potable public water supplies. While most of the DOH's water supply program attention is on water delivered to the consumer, the Public Health Law authorizes the Commissioner of Health to promulgate rules and regulations for the protection of any public water supply from contamination. It is under this authority that the DOH's Watershed Rules and Regulations Program is based. Under the program, the DOH enacts state regulations to protect a specific water supply upon request from the water supplier. Existing and proposed Watershed Rules and Regulations for groundwater sources limit specific activities and prohibit potential sources of contamination from locating within specifically defined areas and may include design specifications for groundwater protection for new facilities allowed in the areas. The level of protection for each area reflects the vulnerability of the source to contamination by activities within the area. Watershed Rules and Regulations are considered to be fully compatible with the Wellhead Protection Program.

5.2.3. Local Government

COUNTY GOVERNMENT

County health agencies in many of the counties in New York State assist, through delegation, in administering major elements of state level (DEC and DOH) programs for water pollution control and water supply regulation. In some cases, county health agencies administer more comprehensive overall programs than those administered by the state. One example is Suffolk County, which provides for enhanced regulation of the storage and handling of toxic and hazardous chemicals. A similar program is also

provided by Nassau County. In such cases, county health agencies perform the bulk of the day-to-day activities required for groundwater management, either through delegation from the state or directly under their own statutory authority. Although these counties have more extensive programs than most Upstate New York counties, they illustrate the important role potential for county health agencies in groundwater management.

An important management role may also be assumed by county planning departments, either through overall coordination of groundwater protection activities among towns or through direct assistance in drafting ordinances or other activities. Among the examples are Schenectady County and Cortland County.

Each county also maintains a County Emergency Management Office as part of the statewide network of emergency planning, data management and response. Their activities are an integral part of local wellhead protection efforts.

A key management issue for counties is to evaluate the potential adoption of county-wide groundwater protection ordinances. Such approaches may be more efficient than town-by-town ordinance implementation. Examples where this has been utilized include counties on Long Island.

TOWNS, CITIES AND VILLAGES

Municipal and town governments have two significant management tools that can be used to provide protection of groundwater and wellhead areas - land use controls and municipal or town ordinances. Under state law, towns, cities and villages are vested with the power to regulate land use. By the home rule provisions of New York State law, the state government will not impose zoning controls and land use requirements on local governments. The enactment of land use controls or zoning allows a municipality to prescribe the type of permitted land use and related activities in a specific land area. Thus, it can prohibit inappropriate land uses such as industrial use in sensitive groundwater areas.

while allowing more appropriate land uses. Within this framework, the site plan review mechanism may be used to require specific engineering designs to protect groundwater for an allowed land use. In addition to zoning, municipalities can adopt local ordinances to control or prohibit activities which may contaminate groundwater such as sewage disposal, hazardous material storage, etc. The development of zoning ordinances and other groundwater protection ordinances at the local government level is voluntary. Statewide groundwater protection controls prevail in all areas. In New York State, the Office of Local Government Services of the Department of State provides training and guidance to local officials in the use and development of zoning and site plan review.

WATER PURVEYORS

The groundwater management activities of water purveyors, whether municipally-owned or privately-owned, are described in Chapter 2, under "Public Water Supply Systems". Briefly, these include compliance with conditions of the water supply permit, initiation and development of optional Watershed Rules and Regulations for submittal to the state DOH, and consumer and water-user education. Because of their exclusive responsibility for providing a potable water supply, water purveyors can and should play a central role in motivating other local officials to implement groundwater protection efforts, and motivating the general public to assist in the effort.

5.2.4. Existing Technical Assistance Program

Technical assistance is available for local governments and water purveyors from a variety of sources. This assistance varies from basic information about groundwater resources to assistance with data interpretation and analysis.

◀ Groundwater Reports and Maps

The Division of Water maintains a limited inventory of reports and maps which are available for loan or possession. In some cases, when a particular item is scarce and cannot leave the office, citations are provided for library searches.

The USGS also has much of the same information.

◀ Source Data from Regulatory Programs

Data regarding the potential contamination sources controlled by the various programs described in Section 5.2.2., above, are available to local management agencies. The nature, size, and location of the facility, in addition to requirements imposed by permits, can be retrieved on request. There are limitations with the ease of retrieval and with the locational information, as discussed in Chapter 4.

◀ Technical Assistance

Assistance from geologists in the Division of Water is available on a limited basis to interpret and analyze groundwater information. This can include modelling of groundwater flow.

◀ Data Acquisition and Interpretation

The Division of Water maintains a cooperative program with the USGS whereby water resources data are collected, organized, and interpreted. Information developed in this program can be used in the creation of local wellhead protection programs.

◀ Other Data Sources

Other types of useful data are available from such sources as county Soil and Water Conservation Districts (soils, land use) and the NYS Geological Survey (geology). Various data sets are available in a geographic information system format through the State Office of Equalization and Assessment.

5.2.5. Existing Financial Assistance Programs

◀ Section 205(f) Funds

NYSDEC has contracted with a number of regional planning and development agencies to undertake a series of demonstration projects in association with the Wellhead Protection Program.

The projects include collection and information on public groundwater supplies, inventorying and mapping contamination threats, and meeting with local officials to explore the development of local protection programs.

- New York State Environmental Quality Bond Act of 1986

The Act provides money for acquisition of aquifer recharge areas when in association with an appropriate local groundwater protection program.

- Nonpoint Source Control Program

Under both the federal Section 319 Program and the state-enacted Nonpoint Source Law, there is the potential for funding wellhead protection activities.

- Federal Clean Water Act - Section 106 Funds

The 1990 appropriation of 106 funds provides monies for wellhead protection.

5.2.6. Existing Education and Training Programs

Education and training activities are carried out by a number of agencies through publication and distribution of guidance materials, presentations at meetings, and direct "one-on-one" assistance.

NYSDEC has underwritten the preparation of a document for guiding the development of local water supply protection programs and distributes it on request and at relevant workshops. The NYSDOH provides guidance on the writing of watershed rules and regulations, which are a primary tool for implementing water supply protection measures. The State Water Resources Institute at Cornell University (WRI) produces written materials and computer software products to provide self-help support to local government. The NYS Department of State distributes a range of guidance manuals on zoning, site plan review, and other aspects of land use control and instructs local officials on these tools at statewide and regional conferences and workshops.

Presentations on wellhead protection options are made by DEC staff at such places as the meetings of the NYS Planning Federation and the Association of Towns of New York State where training workshops for local officials are held. WRI stages short courses and training sessions as part of their educational programs.

Finally, direct assistance is provided by NYSDEC and WRI as resources are available and as demand exists.

5.3. Future Management Considerations

Given the variety and extent of programs available at the federal, state and local level, there are no uncontrolled sources of contamination for wellhead areas. The basic structure exists for addressing all formats.

The primary task for the future is to bring the available program tools to bear on the threats to wellheads. This will be accomplished as a result of increased recognition of threats, outreach and training programs to inform government officials at all levels concerning control options, further development of information on groundwater resources, and development of efforts to focus particular attention of existing programs on wellhead areas.

The future management considerations for wellhead protection areas may be divided into state-level activities and local government activities. In New York State, the principal needs for state-level activities do not entail developing new legislation or regulations, as the existing structure is essentially adequate for protection of all fresh groundwaters, including the wellhead protection areas. The true needs are in more comprehensive implementation of the existing groundwater protection programs and carrying out the remaining implementation recommendations of the adopted Groundwater Management Program relevant to wellhead protection.

Local government activities have a broader range of future management considerations, because current activities are not usually as highly developed as the state-level protection programs.

The needs range from coordination and education to developing, implementing and enforcing the appropriate mix of land use controls and contamination source controls. Generally, the greatest need is implementation and enforcement staff development. Local groundwater and wellhead area protection plans and ordinances, including the preparatory delineation and source inventory, will have little benefit if implementation and enforcement staff resources are inadequate. Education and provision of guidance to local governments are important responsibilities of the state programs.

The key recommendation to local governments in developing wellhead protection management is to first assess local needs and goals for groundwater protection. As part of this process, local officials should familiarize themselves with the basics of the existing groundwater protection efforts at all levels of government and establish a communication and coordination "network" with the many parties that may assist them. These include county health and planning officials, regional planning agencies, DEC, DOH, Soil and Water Conservation Districts, Cooperative Extension, and many of the other parties cited in this document. The importance of communication cannot be overemphasized. Local officials would benefit from the experience of other communities within the state, and such communication is also encouraged.

From this needs and goals assessment, and from a basic knowledge of available state programs and local management options, local officials can best select a preferred "framework" and general plan for local wellhead protection (e.g., Watershed Rules and Regulations, zoning, local ordinances, county ordinances, etc.).

The basic stages of a wellhead protection effort described in the Safe Drinking Water Act (e.g., delineation refinements, inventory, etc.) should be executed within this framework. It is anticipated that localities could waste considerable resources if they proceed directly into advanced delineation refinements or inventories without doing any preliminary goal assessment or coordination with other groundwater management officials.

The following sections briefly highlight three aspects of wellhead protection management relevant to future program considerations.

5.3.1. State Environmental Quality Review (SEQR)

SEQR is a mechanism available to all levels of government within the state to enable consideration of environmental factors early in the planning stages. It relates to actions which are undertaken, funded or approved by state, regional and local government agencies.

A particularly important feature of SEQR for wellhead protection and groundwater management is the provision for designation of Critical Environmental Areas. Local governments may designate specific geographical areas within their boundaries as Critical Environmental Areas. The designated areas become part of the Statewide "TYPE I" list under SEQR, meaning that any state or local agency action within or contiguous to the area will be more likely to be considered significant and therefore require an environmental impact statement and full review. This provision has strong potential for application in areas with sensitive groundwater resources, especially wellhead protection areas. The Department of Environmental Conservation's Division of Regulatory Affairs oversees the SEQR program and provides training and assistance concerning SEQR procedures.

5.3.2. Options and Tools for Protection Program Enhancement

The options and tools for protection program enhancement may have applicability in both state-level and local government programs. They include both regulatory and non-regulatory approaches. The following review is necessarily brief. Further details are available through the appropriate programs (e.g., zoning assistance from Department of State, emergency planning from State Emergency Management Office and DEC, source reduction from DEC Resource Recovery Program and Pollution Prevention Program, etc.). Among the options and tools are:

Engineering Design: New facilities may be designed, or existing facilities may be retrofitted, with specific groundwater protection barriers or controls that enable continued operation or siting of facilities. Examples include: secondary and/or tertiary containment for petroleum or hazardous materials storage; structural coverage of stockpiles; leak detection systems; etc. Approaches may include special permitting, performance standards, septic system upgrades, and other methods. Continued enforcement is needed for these approaches.

Source Reduction: A wide range of management options may be titled source reduction. Existing facilities may continue to operate with emphasis on reducing the threat to groundwater by methods that supplement prohibitions and engineering design. Among the source reduction options are: (1) reducing quantities of chemicals used; (2) conversion to lower-risk alternative chemicals; (3) modifying methods of use to increase efficiencies, including better targeting of applications (e.g., pesticides, coatings, cleaning operations); (4) waste reduction and recycling; (5) updating equipment, replacing storage tanks and container, and more frequent equipment calibration and inspection; (6) improving site plan and layout to reduce accident probability; and (7) improving site to reduce rainfall or runoff entering critical areas. There are many other options. Education and specifically targeted technology transfer and outreach (e.g., material prepared for specific types of businesses) are important tools in source reduction. Approaches may include both voluntary and mandatory elements.

Inspections and Testing: Increasing the frequency or intensity of inspections and testing of facilities and operations is a straightforward approach to enhancing protection. Options for managing the costs of these approaches should be explored, including the potential for

utilizing consulting "environmental monitors" as inspectors, funded by a fee system.

Reporting: More frequent or more detailed reporting requirements for specific facilities and operations is a potential protection tool. However, this option is only useful to the extent that the information can be evaluated and properly stored, and that appropriate responses can be carried out. Staff resources for public agencies is again an important concern. The key need is for improvements in electronic data management, automated transfers of information, developing automated interpretive techniques, and in quality assurance efforts. Improved accuracy and completeness of reporting is an important concern. Solutions may include redesign of reporting requirements and formats and improved guidance.

Prohibitions: Prohibitions are evaluated based on the relative risk of the facility or operation and the availability of engineering design alternatives. Prohibitions may also target specific chemicals themselves, such as solvent septic tank cleaners, rather than entire types of land use. Prohibitions may be adopted as part of Watershed Rules and Regulations, zoning ordinances, or other municipal, county or state ordinances.

Land Use Controls: Land use controls include other options and tools beside prohibitions. Zoning density changes for residential development may be used. Transfer of development rights, whereby certain commercial or industrial development rights are transferred outside of wellhead protection areas (or portions of the overall WHPA) or designated groundwater protection districts, is another tool. Cluster or planned unit development (PUD) design may also be used to guide residential development outside of more sensitive

groundwater areas or to allow better management of wastewater disposal and nonpoint sources. Various growth controls may be utilized to allow more comprehensive development of local groundwater and wellhead protection programs. Subdivision rules may be used to better control drainage and runoff in subdivisions in sensitive groundwater areas. Site plan review may be utilized to require engineered contamination prevention barriers and other designs for permitted development. These opportunities provide a diverse menu of tools that enable more sophisticated local protection programs than generalized land use prohibitions.

- ◀ Water Withdrawal Controls: Water withdrawal controls are commonly recognized as a primary tool for water quantity management, but they also may play a role in water quality management. The DEC Water Supply Permit Program, described in Chapter 7, regulates water withdrawals for both objectives. Water withdrawal management is particularly important for controlling saltwater intrusion in coastal areas, for controlling the influences of withdrawals on migration of contaminants from nearby contamination plumes or contaminated aquifers (in multiple aquifer systems), and for altering groundwater flow patterns and consequently the relevant shapes and sizes of existing wellhead protection areas.

- ◀ Monitoring: Groundwater sample collection and analysis is a potential option associated with others cited above. Monitoring is useful to the extent that the sampling is truly representative of the groundwater regime of concern, that frequency is adequate, that data variability does not prevent determination of actual contamination, and that reported data are managed in a retrievable and interpretable fashion. The greatest potential for monitoring applications is in "source monitoring";

that is, monitoring at or very close to known high priority potential contamination sources. Generalized ambient monitoring of aquifers or wellhead protection areas (i.e., not targeting a potential source or the water supply well itself), sometimes called "early warning monitoring", may be conceptually desirable but is very likely to be impractical and very inefficient if attempted for all systems. It may be appropriate in special circumstances. The major problem is that truly representative sampling would require many locations, several depths at each location, frequent sampling, and many chemical constituents. Data variability and statistical interpretations are serious concerns in properly using monitoring results. Associated with this is the major burden of well installation, hydrogeologic characterization, proper sample collection and handling, and data management. The total analytical costs, themselves, would be enormous. Although ambient monitoring can have special value in specific locations and in research, the total resources for universal adoption would be far better spent on other options cited above to achieve greater degrees of groundwater protection.

- ◀ Emergency Planning: Emergency planning is an ongoing activity to plan for response to accidents, spills, and other emergencies. The principal goal in this case is to facilitate the fastest, most efficient and most effective proper response to emergencies that threaten groundwater quality. The existing emergency planning and response programs can be enhanced by various options including: (1) requiring risk management and emergency planning for a wider range of facilities or operations than at present; (2) requiring clearly visible posting at all facilities of key contacts (owners/operators, hazmat response teams, standby cleanup contractors, fire departments, etc.); (3) fire department preplanning for responses

at all important facilities; and (4) instituting county or regional hazmat (emergency response) teams to assist in local emergencies. The keys are speed and appropriate response. Any approach that enhances these may have potential. Facilities and industries may have standby emergency cleanup contractors that can mobilize faster than state government contractors. Local authorities should maintain records of these cases. Knowledge of who to contact is a critical concern.

• **Land Acquisition and Conservation Easements:** Land acquisition is the most effective method for ensuring control of sensitive groundwater areas. However, it is very urgent that lands acquired for such purposes not be misused for government activities which represent potential contamination threats (e.g., waste disposal, petroleum storage, salt storage, etc.). Donations and conservation easements should also be explored. The passage of a special additional 0.25% sales tax by a public vote in Suffolk County to provide funds for land acquisition should demonstrate the interest and concern of citizens to support this approach.

• **Best Management Practices (BMPs) and Guidance:** To supplement regulatory oversight, best management practice documents and other types of guidance may be developed and distributed to specifically targeted types of facilities or operations, concerning risk reduction and other forms of protection against groundwater contamination. These approaches may require follow-through, redistribution and special training to maintain or enhance their effectiveness.

• **Education, Guidance and Technical Assistance:** Citizen education, guidance for local government officials and technical assistance have obvious benefits for enhancing wellhead protection efforts. Despite this generally

accepted notion, the potential cost savings by providing well targeted guidance are often overlooked. Good guidance will avoid unnecessary costs and overspending on less important elements, and, most importantly, can save considerably by getting the job done right much more quickly. Technology transfer and training assistance are key areas where a state-federal partnership can improve local protection programs. Road sign posting of protection areas may be a useful approach to promote public recognition of wellhead protection.

• **Coordination:** Directly related to the issue of guidance and assistance is the subject of coordination at all levels of government. In New York State, the level of government which generally has the greatest potential for enhancing groundwater protection through coordination is the county level. County agencies are best suited to assist their towns and villages directly and frequently. They are also an excellent link with state agencies. It is most cost-efficient for towns, villages and small cities to rely on county staff for groundwater coordination. Counties which have developed this capability in either their health or planning agencies (or in environmental agencies, if they exist) have benefitted considerably. The skills that may be tapped or developed at this level include both technical skills (hydrogeology, environmental chemistry, environmental engineering) and management skills (ordinance drafting, public speaking and writing, enforcement techniques). Coordination is further discussed in the following section.

5.3.3. Jurisdictional Coordination in Wellhead Protection Areas

As with most facets of government and public authority, multi-jurisdictional issues may occur with wellhead protection areas. Given the existing governmental structure in New York State, the

locations of public water supply wells, and other factors (existence and nature of federal lands, the nature and extent of aquifers, availability of State Watershed Rules and Regulations, etc.), significant problems are considered to be unlikely.

First, one means for resolving multi-jurisdictional issue among municipalities or counties is the promulgation of Watershed Rules and Regulations. Coordination is directly achieved through promulgation of the regulations, which are considered by New York State to represent an acceptable wellhead protection program.

County government is generally strong in New York State and a significant portion of multi-jurisdictional coordination is achieved directly by county agencies. Among counties, coordination is achieved through several avenues. First, regional planning agencies are well established in New York State and have been increasingly involved with groundwater protection in recent years. Second, the State Department of Environmental Conservation, in particular, and the State Department of Health have strong regional presence in New York State with responsibilities for local coordination with both counties and municipalities. Finally, coordination is provided by a wide range of assisting associations and agencies (including the Association of Towns, Association of Counties, Conference of Mayors, New York Planning Federation, Cooperative Extension, Soil and Water Conservation Districts, Water Resources Institute, etc.).

Concerning international jurisdictional issues, problems are nonexistent because public water supply wells in the general border area are extremely rare. Those located there would have appropriate protection areas entirely within New York State.

Nearly the same conditions occur along the interstate borders. Interstate coordination has not been a problem with respect to groundwater. In the event that such coordination is needed, New York's interstate borders are covered by the following interstate compacts of which New York is a member.

- ◀ New England Interstate Water Pollution Control Commission (NEIWPCC)
- ◀ Ohio River Valley Water Sanitation Commission (ORSANCO)
- ◀ Susquehanna River Basin Commission (SRBC)
- ◀ Delaware River Basin Commission (DRBC)

Federally-owned land is very limited in New York State, and the occurrence of public water supply wells on or in the vicinity of federal land is very rare. Coordination with other federal agencies concerning wellhead protection will be accomplished by the Department of Environmental Conservation working through the U.S. Environmental Protection Agency - Region II Office, and direct interaction with the federal authorities on-site where possible. This approach has been successful in the past and no problems are anticipated.

5.4. Summary

A simplified summary of existing institutions responsible for management of potential groundwater contamination sources is presented in Table 5.2.

TABLE 5.2

EXISTING INSTITUTIONAL RESPONSIBILITIES FOR SOURCE MANAGEMENT

SOURCE	INSTITUTIONS (See Key)
<p>CATEGORY 1: <u>Sources Designed To Discharge Substances</u></p> <ul style="list-style-type: none"> - Subsurface percolation (e.g., septic tanks and cesspools) - Injection wells <ul style="list-style-type: none"> . Hazardous waste . Non-hazardous waste (e.g., brine disposal and drainage) . Non-waste (e.g., enhanced recovery, artificial recharge solution mining and in-situ mining) - Land application <ul style="list-style-type: none"> . Wastewater (e.g., spray irrigation) . Wastewater by-products (e.g., sludge) . Hazardous waste . Non-hazardous waste <p>CATEGORY 2: <u>Sources Designated to Store, Treat, and/or Dispose of Substances; Discharge Through Unplanned Release</u></p> <ul style="list-style-type: none"> - Landfills <ul style="list-style-type: none"> . Industrial hazardous waste . Industrial non-hazardous waste . Municipal Sanitary - Open dumps, including illegal dumping (waste) - Residential (or local) disposal (waste) - Surface impoundments <ul style="list-style-type: none"> . Hazardous waste . Non-hazardous waste 	<p>CHD*, DOH*, MUN</p> <p>DOH*, EPA*, DEC DEC*, DOH*</p> <p>DOH</p> <p>DEC* DEC* DEC* DEC*, DOH</p> <p>DEC*, DOH*, EPA*, CHD*, MUN DEC*, CHD*, DOH, EPA, MUN DEC*, CHD*, MUN*, EPA</p> <p>DEC*, CHD*, DOH, MUN</p> <p>DEC*, CHD*, MUN</p> <p>DEC*, CHD*, DOH DEC*, CHD*, DOH</p>

TABLE 5.2
EXISTING INSTITUTIONAL RESPONSIBILITIES FOR SOURCE MANAGEMENT
(Continued)

<u>SOURCE</u>	<u>INSTITUTION</u> (See Key)
<ul style="list-style-type: none"> - Waste tailings - Waste piles <ul style="list-style-type: none"> . Hazardous waste . Non-hazardous waste - Materials stockpiles (salt, coal, etc.) - Graveyards - Animal burial - Aboveground storage tanks <ul style="list-style-type: none"> . Hazardous waste . Non-hazardous waste . Non-waste (petroleum, etc.) - Underground storage tanks <ul style="list-style-type: none"> . Hazardous waste . Non-hazardous waste . Non-waste (petroleum, etc.) - Containers <ul style="list-style-type: none"> . Hazardous waste . Non-hazardous waste . Non-waste - Open burning and detonation sites - Radioactive disposal sites 	<p style="text-align: center;">DEC*</p> <p style="text-align: center;">DEC*, DOH*, CHD*, EPA DEC*, CHD*, DOH</p> <p style="text-align: center;">DEC*, CHD*, DOT, MUN, DOH</p> <p style="text-align: center;">DOH*, CHD*</p> <p style="text-align: center;">DOH*, DEC*</p> <p style="text-align: center;">DEC*, MUN, CHD DEC*, MUN, CHD DEC*, MUN, CHD</p> <p style="text-align: center;">DEC*, MUN, CHD DEC*, MUN, CHD DEC*, MUN, CHD</p> <p style="text-align: center;">DEC*, MUN, CHD DEC*, MUN, CHD DEC*, MUN, CHD</p> <p style="text-align: center;">DEC*, CHD*, MUN</p> <p style="text-align: center;">DEC*, DOH*, MUN</p>
<p>CATEGORY 3: <u>Sources Designed to Retain Substances During Transport or Transmission</u></p> <ul style="list-style-type: none"> - Pipelines <ul style="list-style-type: none"> . Hazardous waste . Non-hazardous waste . Non-waste (petroleum, etc.) 	<p style="text-align: center;">DEC* DEC* DEC*</p>

TABLE 5.2
EXISTING INSTITUTIONAL RESPONSIBILITIES FOR SOURCE MANAGEMENT
(Continued)

SOURCE	INSTITUTION (See Key)
<ul style="list-style-type: none"> - Materials transport and transfer operations <ul style="list-style-type: none"> . Hazardous waste . Non-hazardous waste . Non-waste (petroleum, etc.) 	DEC*, DOH DEC*, DOH, MUN DOT*, DEC
CATEGORY 4: <u>Sources Discharging Substances as a Consequence of Other Planned Activities</u>	
<ul style="list-style-type: none"> - Irrigation practices (e.g., return flow) 	CE, SWCD
<ul style="list-style-type: none"> - Pesticide applications 	DEC*, DOH, CE, SWCD
<ul style="list-style-type: none"> - Fertilizer applications 	CE, SWCD
<ul style="list-style-type: none"> - De-icing salts applications 	DEC, DOT, MUN
<ul style="list-style-type: none"> - Urban runoff 	DEC, MUN
<ul style="list-style-type: none"> - Percolation of atmospheric pollutants 	DEC*
<ul style="list-style-type: none"> - Mining and mine drainage <ul style="list-style-type: none"> . Surface mine-related . Underground mine-related 	DEC*, SWCD DEC*, SWCD
CATEGORY 5: <u>Sources Providing Conduit or Inducing Discharge Through Altered Flow Patterns</u>	
<ul style="list-style-type: none"> - Production wells <ul style="list-style-type: none"> . Oil (and gas) wells . Geothermal and heat recovery wells . Water supply wells . Solution Mining Wells 	DEC* DEC* DOH*, DEC*, CHD*, MUN* DEC*

TABLE 5.2
EXISTING INSTITUTIONAL RESPONSIBILITIES FOR SOURCE MANAGEMENT
 (Continued)

<u>SOURCE</u>	<u>INSTITUTION</u> (See Key)
<ul style="list-style-type: none"> - Other wells (non-waste) Monitoring wells Exploration wells - Construction excavation CATEGORY 5: <u>Naturally occurring Sources</u> <u>Whose Discharge Is</u> <u>Created and/or Exacer-</u> <u>bated by Human Activity</u> <ul style="list-style-type: none"> - Groundwater-surface water interactions - Natural leaching - Saltwater intrusion brackish water upconing (or intrusion of other poor quality natural water) 	<ul style="list-style-type: none"> DEC, DOH, CHD DEC*, DOH MUN*, DEC, SWCD DEC* DEC* DEC*

KEY: * = Major Responsibility

CE = Cooperative Extension
 CHL = County Health Departments
 DEC = NYS Department of Environmental Conservation
 DOH = NYS Department of Health
 DOT = NYS Department of Transportation
 EPA = U.S. Environmental Protection Agency
 MUN = Municipal Government
 SWCD = Soil and Water Conservation District

Absence of a designation does not preclude additional or related responsibilities of similar or other local, state or federal institutions.

CHAPTER 6

CONTINGENCY PLANNING

6.1. Introduction

In New York State, the Department of Health, through the authorities provided to it in the Public Health Law (PHL), oversees and regulates the development of contingency or emergency plans for public water systems. In addition, the New York State Division of Military and Naval Affairs, Office of Disaster Preparedness, oversees and coordinates the stockpiles of emergency equipment that are available to assist in responding to public water supply emergencies.

The federal Safe Drinking Water Act requirements for contingency planning (Subsections 1413(b)(5) and 1428(a)(5)) are satisfied by the program administered by the Department of Health. An additional aspect of contingency planning is required under the federal Superfund Amendments and Reauthorization Act (SARA) Title III. The SARA emergency planning program, which requires reporting of routine and accidental releases of toxics to air, water and land, is administered by the New York State Department of Environmental Conservation. In actual practice, this program is most useful for indicating potential problem areas. Response to immediate public water supply threats is coordinated with DOH and water suppliers.

6.2. Emergency Planning Program

The new emergency (or contingency) planning program administered and coordinated by the New York State Department of Health contains all four elements suggested by USEPA for consideration by states in the Wellhead Protection Program along with additional items. The first two elements, temporary and long-term alternate water supply assessment, are included in the DOH requirement for identification of existing and future water supply sources in both emergency and non-emergency conditions. The final two, coordination and financial responsibility assessment, are included in the DOH requirement for specific action plans. The key responsibilities

are with the water purveyor, with oversight by the New York State Department of Health.

On September 24, 1988, revisions to Section 5-1.33 of Part 5 of the New York State Sanitary Code were promulgated. This section entitled "Water Supply Emergency Plans" requires the following:

1. All community water systems with an annual gross operating revenue of greater than \$125,000 must develop and submit to the state a water supply emergency plan by December 31, 1990 and update the plan every five years.
2. The plan must include at a minimum:
 - The development of procedures for providing consumer notification during all phases of the water supply emergency;
 - The development of criteria and procedures for determining the subsequent reporting of critical water levels of safe yield of the source or sources of water;
 - The identification of existing and future sources of water available during normal non-emergency and water supply emergency conditions;
 - The identification of all available water storage, including source, transmission and distribution system storage;
 - The identification, capacity and location of existing interconnections. Identification of additional interconnections needed to provide potable water during a water supply emergency;
 - The development of a specific action plan outlining all the steps to be implemented, taken or followed during a water supply

emergency, including state notification, emergency notification rosters of key water supply personnel with current telephone numbers (both business and home), and follow-up correction action to minimize the reoccurrence of an emergency;

- The identification and implementation of procedures for water conservation and water use restrictions to be put in place during a water supply emergency;
 - The identification of and the procedures for prioritization of potable water use during a water supply emergency;
 - The identification of availability of emergency equipment needed during a water supply emergency;
 - A development of criteria and procedures for determining and the subsequent reporting of the water supplier's capacity and ability to meet peak water demands and fire flow conditions concurrently.
3. A vulnerability assessment must be performed for the source or sources of water supply, the public water system, disinfection stations and water treatment plants to determine the vulnerability of these water supply components to a water supply emergency. The water supplier shall take whatever steps are necessary to ensure that potable water can be and is available during a water supply emergency.
 4. The state can require any other community or non-community water system to develop emergency plans.

The NYS Department of Health currently is revising its guidance available for use by public water systems in developing their emergency plans. It is not expected that the revised guidance will deviate significantly from the existing guidance. The existing guidance includes a generic outline or framework of worksheets and checklists that will assist the water system in developing its plan. This outline includes topics

such as: map of the entire public water system, including source locations and activities that may affect the system such as contamination threats, transportation corridors, etc.; data on sources; assessments of types of emergencies; component vulnerability assessment forms; notification roster; and hazardous material spill vulnerability checklist.

The DOH has also developed statewide policy procedures and guidance for dealing with ongoing water supply emergencies. These include procedures for dealing with community water system emergencies, reporting water borne disease outbreaks and guidance on boil water notices and blending of sources.

6.3. Emergency Equipment Stockpiles

The New York State Division of Military and Naval Affairs, Office of Disaster Preparedness (ODP), coordinates the New York State Emergency Equipment Stockpiles. This equipment is available on an emergency loan basis to local political subdivisions and other state agencies primarily to assist in responding to potable water supply emergencies. The stockpiles consist of high capacity pumps, water filters, chlorination equipment, generators, light weight-quick coupling aluminum pipe, water couplings, and adapters necessary to provide delivery of an emergency source of drinking water.

In addition to the stockpile maintained by New York State at Waterford (near Albany) and Pittsford (near Rochester), each District Office of Disaster Preparedness coordinates a district stockpile which is maintained by various counties in each District. The District stockpile equipment is federal property and is considered a Civil Defense resource. District stockpiles of emergency equipment are not intended to be under direct state control in times other than an emergency. However, this equipment is a district resource available on a cooperative basis to any jurisdiction which is in need of it. District stockpile equipment loans are coordinated through the ODP District Offices.

6.4. Wellhead Protection Program Submittal

Section 1428(a)(5) of the SDWA requires that the State WHP Program include contingency plans "for the location and provision of alternate drinking water supplies for each public water system in the event of well or wellfield coordination."

The requirements of NYSDOH's emergency planning program not only meet the state's requirements of Section 1428(a)(5) of the SDWA, but actually go beyond them since the state's program deals with all forms of water supply emergencies.

For the purposes of meeting the federal Wellhead Protection Program, New York State will define those community water systems with an annual gross operating revenue of greater than \$125,000 as "major" public water systems. The federal guidance calls for all major public water systems to have a completed contingency plan at the time of the state's Wellhead Protection Program submittal. The recent promulgation of the revisions to the State Sanitary Code required plan submittals to the NYSDOH by December 31, 1990. It is not feasible to revise this schedule, nor does New York State consider it reasonable or necessary.

Implementation of the emergency plan requirements at other groundwater source community and non-community public water systems should be accomplished as resources permit. Remaining community water systems should be dealt with first on the basis of population served -- the greater the population served, the higher the priority. Non-community systems should then be addressed.

CHAPTER 7

NEW WELLS

7.1. Institutional Processes

The protection of new public water supply wells will be accomplished through a variety of methods from state-level contamination source controls, to county, town and village or city land use controls. The institutional mechanism that will guide the protection and management of new wells is the set of procedures for the Public Water Supply Permit Program, operated by the New York State Department of Environmental Conservation.

This program, authorized by the Environmental Conservation Law Article 15, Title 15 and regulated under 6 NYCRR Parts 601 and 602, is more thoroughly described in DEC's Division of Water Technical Operation Guidance Series (TOGS) 3.2.1., "Public Water Supply Permit Program Application Processing." This document contains complete descriptions of responsibilities, technical review, procedures for objections and hearings, and permit conditions along with other information.

The permit conditions currently include elements that are consistent with Wellhead Protection Program objectives. The permit conditions will be revised to strengthen wellhead protection principles at the time that a new well permit is approved.

Currently, these permit conditions include, but are not limited to, the following:

- ◄ **Direct Control of the Wellhead**

Construction and installation standards (NYS Health Department Bulletin 42, "Recommended Standards for Water Works"; administered by NYSDOH).

- ◄ **Strict Protection Zone**

A strict protection zone of a minimum 200-foot radius (variances possible in special

circumstances, if approved by DEC) shall be protected and controlled by direct ownership or the land, by the acquisition of protection easements or by other appropriate measures (to be approved by DEC).

This area shall further be protected from pollution by surface waters by the construction of suitable diversion ditches or embankments, and the development of the wells shall be carried out that there shall be no opportunity for pollution to enter the wells.

- ◄ **Water Quality Monitoring Requirement**

Prior to permit approval.

- ◄ **Watershed Protection Requirement**

The permittee is required to adopt Watershed Rules and Regulations, pursuant to Section 1100 of the NYS Public Health Law, for all surface water sources. However, this requirement may be waived by the DEC Water Supply Permit Program for groundwater sources if the degree of protection provided by a specifically defined zone (fixed radius or calculated) and other existing control measures is considered adequate by DEC.

The permit procedure and the permit conditions designated by DEC provide the best and simplest means for including new wells in the Wellhead Protection Program. The watershed protection permit conditions, including potential enhancements of the above conditions, afford the best opportunity for refinement of wellhead protection for new wells. Permit conditions, for example, enable DEC's Public Water Supply Permit Program to require new surface water supply permittees to adopt Watershed Rules and Regulations even though they are otherwise voluntary under New York State Department of

Health programs. This and other aspects are discussed in the next section.

7.2. Wellhead Protection for New Wells

The current procedures for permit conditions allow applicants for new wells the option of not adopting Watershed Rules and Regulations if the protection zone (fixed radius or calculated) and other measures are considered adequate by the DEC Water Supply Permit Program.

The New York State Wellhead Protection Program proposes that the new well permit conditions be amended to require the permittee to develop and adopt a wellhead protection plan to be approved by DEC. DEC recognizes that these plans may vary depending on local conditions and capabilities and that implementation will be an evolutionary process. This plan may take the form of local ordinances (town, village, city, county) or protection program enhancements, or the form of Watershed Rules and Regulations (DOH approval), or other options described in Chapter 5. The local program should be consistent with the proposed State Wellhead Protection Program.

In cases where privately-owned public water systems are the permittees, the supplier is still proposed to be responsible for developing the required wellhead protection plan. Adoption and implementation of such a plan will, however, typically require the endorsement and cooperation of local government authorities. In such cases, it is proposed that the Water Supply Permit Program require the permittee, in cooperation with the appropriate local authorities, to provide a wellhead protection implementation plan. This may include Watershed Rules and Regulations or other appropriate agreements with local authorities, and is subject to DEC approval.

It is also proposed that the permit conditions be amended to require the permittee to show site-specific hydrogeologic evidence that the remedial action area (or inner zone proposed in the local plan) is adequately protective against biological contamination. For this portion of the wellhead protection area, a guideline of a 60-day minimum time-of-travel may be allowed. The 60-day

criterion has been used in New York State and many European nations to provide adequate die-off of microorganisms. Time-of-travel should be considered from the point of potential contamination discharge. Alternative methods and criteria may be accepted in delineating this zone. In certain cases, existing land uses may be considered in delineating the remedial action zone as approved by DEC. Finally, it is proposed that all applicants for new well permits file a well log with the DEC Water Supply Permit Program at the time of completion of the well.

This approach for new wells will still allow local flexibility for delineating further subdivisions with the overall WHPA, and in determining the appropriate local management controls. The overall delineation for the total wellhead protection area and other policies of the State Wellhead Program would be retained. Such flexibility is necessary due to considerable variation in hydrogeologic conditions, contamination threats, and local authorities and capabilities. However, the approach is stronger in that wellhead protection plan adoption is mandatory for new well permit approval. Many existing wells are covered or will be covered by local wellhead protection plans. The Water Supply Permit Program may reopen the permit process to include existing wells in this process. The delineations performed as part of this procedure may utilize the baseline delineations described in Chapter 3, but should preferably utilize a three-zone approach.

Finally, the program accomplishments and strategies described in the Upstate and Long Island Groundwater Management plans (Department of Environmental Conservation) are recognized as part of the Wellhead Protection Program for new wells. Specific projects, such as the Special Groundwater Protection Area project by the Long Island Regional Planning Board, target planning for additional protection of groundwater resources with potential for future use. Similarly, in Upstate New York, inclusion of aquifer areas in the Wellhead Protection Program provides a means of protecting groundwater resources that may be utilized for future public water supplies even though specific well locations may not yet be known.

The NYS Water Resources Management Strategy (NYS Water Resources Planning Council, 1989; 14 volumes) also includes elements related to new wells. The recommendations of this strategy for water supply source protection, endorsed by the Water Resources Planning Council representing both public members and eight New York State agencies, support the "multiple-layer" management concepts (state and local controls) and the Watershed Rules and Regulations and local ordinance options. Comprehensive water supply system management, which includes an analysis of future water needs and creation or revision of Watershed Rules and Regulations, is a major recommendation of the Water Resource Strategy.

The Water Supply Permit Program itself does not specifically manage the sources of contamination. The permit program is used to require adoption of local programs for wellhead protection. The management of the sources is accomplished first and most importantly by the comprehensive state-level management programs described elsewhere in this submittal. Local government protection programs may take various forms, including county-level sanitary codes, town ordinances, water supplier watershed rules and regulations, and zoning ordinances. The implementation and enforcement of these local programs provide additional levels of source controls, and are the responsibility of corresponding local authority.

CHAPTER 2

SUMMARY OF PUBLIC PARTICIPATION IN THE DEVELOPMENT OF THE WELLHEAD PROTECTION PROGRAM

Section 1428(b) of the Safe Drinking Water Act requires that state wellhead protection programs be developed with the participation of the public including technical and citizens' advisory committees.

For partial compliance with the federal requirements and to gain the benefit of expertise of people outside the Department, a Wellhead Protection Advisory Committee was convened by the Director of the Division of Water October 12, 1988. The advisory committee consisted a broad spectrum of persons active and interested in groundwater protection efforts. Included were representatives of water purveyors, county government, regional planning boards and commissions, legislative staff, state agencies and private citizens. The roster is presented in the **ACKNOWLEDGEMENTS** at the front of this report.

The committee met formally three times to discuss the issues to be addressed in the wellhead program. The members also reviewed draft materials as the document took shape.

Issues which the Advisory Committee raised included the following:

1. The level of knowledge about groundwater varies enormously among local officials across the state. Some have a sophisticated understanding of groundwater and the tools available to protect public supplies; some need a basic knowledge of groundwater hydrology. The wellhead program must reach both extremes of the audience.
2. DEC should have its data bases on facilities it regulates organized and available for use by others to facilitate the understanding of sources of potential groundwater contamination.
3. Authorization for the Wellhead Protection Program in New York State will not require new legislation or regulations. Guidance, education, and promotion should be the primary means of establishing local programs.
4. To effectively deliver the wellhead protection message, there must be an aggressive outreach program which goes beyond printing brochures and reports.
5. Delineation procedures must be considered in the context of what is to be accomplished on the management programs. They are not purely technical exercises.
6. For implementing local protection programs, flexibility should be provided in having choices available to municipal officials and water purveyors. Watershed Rules and Regulations may be appropriate in many instances, but alternative protection schemes such as groundwater protection ordinances, zoning and site plan review procedures should be recognized as legitimate elements of a wellhead protection program.
7. While baseline delineations are needed, the program must recognize that where technical justification is available, deviations from the baseline criteria must be allowed. For instance, deep wells in confined aquifers that tap a horizontal groundwater flow regime may gain no increased protection from a 200-ft. radius Zone I than one of lesser area.
8. In densely developed areas and in many areas where critical aquifer segments cross municipal boundaries, a county-wide approach to groundwater protection may be appropriate.

9. Outreach and education programs should also focus on groups outside of government and the water supply industry. Bankers, insurance agents and other business persons should be aware of wellhead protection issues.
10. To assist the development of a consistent approach to creation of data bases and geographic information systems, the state should provide guidance and specification.
11. The outreach effort should include input from other capable agencies such as Cooperative Extension, Soil and Water Conservation Districts, the Department of State, the Water Resources Institute, and others.
12. In selecting source control programs for adjustment for wellhead protection concerns, the occurrence of problems should be reviewed so that the most significant sources are addressed first.

The more widespread public review of the submittal will be accomplished as follows:

1. The document will be distributed DEC and DOH regional offices, regional planning and development boards, county health departments, county planning departments, key local government associations, the Wellhead Protection Advisory Committee and to those persons that have expressed interest in the program.
2. The availability of the document for review at the planning offices and DEC sub-offices will be announced via the Environmental Notice Bulletin.
3. A public hearing will also be announced in the Environmental Notice Bulletin.

When the comments are received and the public hearing concluded, revisions to the program will be considered.

SUPFOLK COUNTY SANITARY CODE

**ARTICLE 7
WATER POLLUTION CONTROL**

AMENDED APRIL 9, 1986

**ARTICLE 7
WATER POLLUTION CONTROL**

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SUFFOLK COUNTY SANITARY CODE
ARTICLE 7 - WATER POLLUTION CONTROL

Section 701. Declaration of Policy

The designated best use of all groundwaters of Suffolk County is for public and private water supply, and of most surface waters for food production, bathing and recreation. The federal government has officially designated the aquifer below Suffolk County as a sole-source for water supply. Therefore, it is hereby declared to be the policy of the County of Suffolk to maintain its water resources as near to their natural condition of purity as reasonably possible for the safeguarding of the public health and, to that end, to require the use of all available practical methods of preventing and controlling water pollution from sewage, industrial and other wastes, toxic or hazardous materials, and stormwater runoff.

Section 702. Statement of Purpose

It is the intent and purpose of this article to safeguard all the water resources of the County of Suffolk, especially in deep recharge areas and water supply sensitive areas, from discharges of sewage, industrial and other wastes, toxic or hazardous materials and stormwater runoff by preventing and controlling such sources in existence when this article is enacted and also by preventing further pollution from new sources under a program which is consistent with the above-stated Declaration of Policy.

Section 703. Definitions

Whenever used in this article, unless otherwise expressly stated, or unless the context or subject matter requires a different meaning, the following terms shall have the respective meanings set forth or indicated.

- A. **Board** means the Suffolk County Board of Health.
- B. **Commissioner** means the Commissioner of the Suffolk County Department of Health Services.
- C. **Communal Sewage System** means a series of sanitary intercepting sewers or intercepting collecting sewers, pumping stations, sewage treatment plants, and associated pollution control facilities for the conveyance, treatment, and disposal of sewage operated by a person other than a municipality.
- D. **Deep Recharge Area** means a geographic area of Suffolk County that contributes recharge water to a deep groundwater flow system, thus replenishing the quantity and affecting the quality of the long-term water supply. These areas are identified as Groundwater Management Zones I, II, III and V.

E. Department means the Suffolk County Department of Health Services.

F. Discharge means to release by any means or to relinquish control in a manner that could result in a release to the surface waters, groundwaters, surface of the ground, or below ground.

G. Disposal System means any plumbing or conveyances which result in or are capable of resulting in a discharge of sewage, industrial wastes, toxic or hazardous materials, stormwater runoff, cooling water or other wastes. This includes but is not limited to septic tanks, leaching pools, sumps, tile fields, holding tanks, outfalls and connecting piping.

H. Groundwater Management Zone means any of the areas delineated in Suffolk County by the "Long Island Comprehensive Waste Treatment Management Plan (L.I. 208 Study)," as revised by the "Long Island Groundwater Management Plan," and subsequent revisions adopted by the Board identifying differences in regional hydrogeologic and groundwater quality conditions. The boundaries of the Groundwater Management Zones are set forth on a map adopted by the Board filed in the Office of the Commissioner in Hauppauge, New York.

I. Housebarge means the same as Houseboat except that a housebarge has no self-contained mechanical method of propulsion.

J. Houseboat means a floating structure used as a dwelling with a self-contained mechanical method of propulsion, not primarily designed to be a means of locomotion over water. The design criteria shall be generally accepted standards of naval architecture.

K. Industrial Waste means any liquid, gaseous, or solid waste substance or a combination thereof resulting from any operation or process of industry, manufacturing, trade or business or from the development or recovery of any natural resources, which may cause or might reasonably be expected to cause pollution of the water resources of the County of Suffolk in contravention of the requirements of this article.

L. Municipal Sewage System means the series of sanitary intercepting sewers or intercepting collecting sewers, pumping stations, sewage treatment plants, or pollution control facilities, drains and other facilities, connections and equipment or any combination of the aforementioned, for the conveyance, treatment and disposal of sewage operated by the County of Suffolk or a municipality within the County of Suffolk.

M. Offensive Material means any sewage or non-sewage fecal matter, urine, garbage, waste, or any putrescible organic matter, scavenger waste, the contents of private or individual sewage disposal systems, either liquid or solid, or other substances or liquid which may adversely affect health.

N. Other Wastes means refuse, spillage and the leaching from these materials, oil, tar, acids, chemicals, and all other discarded matter which may reasonably be expected to cause pollution of the waters of the County of Suffolk.

O. Private or Individual Sewage Disposal System means a water-flush facility for the disposal of sewage which does not connect either with a municipal or communal sewage system. This includes, but is not limited to, septic tanks, leaching pools and tile fields.

P. Restricted Toxic or Hazardous Materials shall mean the following toxic or hazardous chemicals that have been or could be expected to be detected in the groundwater, or in discharges to the groundwater, of Suffolk County. This definition applies to these substances alone or in combination, solution or mixture with other substances, or chemically compounded with other elements or compounds.

Arsenic	Freon 113
Barium	Lead
Benzene	Mercury
Bromobenzene	Methylene Chloride
Bromodichloromethane	Nickel
Bromoform	Pesticides
Cadmium	Petroleum Distillates
Carbon Tetrachloride	Phenols
Chlorobenzene	Phthalates
Chlorodibromomethane	Roadway Deicing Salt
Chloroform	Silver
Chlorotoluene	Styrene
Chromium	Tetrachloroethylene
Cis 1,2 Dichloroethylene	1,2,4,5 Tetramethylbenzene
Creosotes	Toluene
Cyanide	1,2,3 Trichlorobenzene
Dichlorobenzene	1,2,4 Trichlorobenzene
1,1 Dichloroethane	1,1,1 Trichloroethane
1,2 Dichloroethane	1,1,2 Trichloroethane
1,1 Dichloroethylene	1,1,2 Trichloroethylene
1,2 Dichloropropane	1,2,3 Trichloropropane
p-Diethylbenzene	1,2,4 Trimethylbenzene
Ethylbenzene	1,3,5 Trimethylbenzene
p-Ethyltoluene	Vinyl Chloride
Fluoride	Xylenes

All other halogenated hydrocarbon compounds.

Q. Sewage means the water-carried human or animal wastes from residences, buildings, industrial establishments or other places, together with such groundwater infiltration and surface water as may be present. A mixture of sewage as herein defined and industrial wastes or other wastes as defined above may be considered industrial wastes or commingling within the meaning of this article.

R. Stormwater Runoff means the portion of total precipitation that travels over natural and developed land surfaces (e.g., woodlands, lawns, farms, gardens, roofs, driveways, parking lots, roads, etc.) transporting contaminants that may be present.

S. Temporary Disposal System means a system for the disposal of sewage where such system is intended for use for a specified period of time prior to completion of the construction of an approved sewage treatment and disposal system.

T. Toxic or Hazardous Materials shall mean the same as defined in Article 12 of this Code.

U. Toxic or Hazardous Wastes shall mean the same as defined in Article 12 of this Code.

V. Treatment System means a system designed to reduce or alter the contaminant content of sewage or industrial waste for the purpose of permitting the discharge of some portion of said waste.

W. Water Supply Sensitive Areas means:

1. A groundwater area separated from a larger regional groundwater system where salty groundwater may occur within the Upper Glacial aquifer, and where deepening of private wells and/or the development of community water supplies may be limited; or

2. Areas in close proximity to existing or identified future public water supply wellfields. In general, for the purposes of this article, "close proximity" shall mean within 1,500 feet upgradient or 500 feet downgradient of public supply wells screened in the Upper Glacial aquifer.

3. A limited water budget area, not underlined by fresh Magothy, defined by published reports acceptable to the commissioner.

4. The areas described in items W.1., 2., 3., above are set forth on a map adopted by the Board filed in the Office of the Commissioner in Hauppauge, New York.

Section 704. Powers of the Commissioner

The commissioner may:

A. make, or cause to be made, any investigation which, in his opinion, is needed for the enforcement of this article or for controlling or reducing the potential for contamination of the waters of the county from sewage, industrial or other wastes, toxic or hazardous materials and/or stormwater runoff;

B. approve, with conditions, non-residential structures, processes, facilities and activities in deep recharge areas and water supply sensitive areas to assure compliance with Section 706. Such conditions shall be embodied in covenants running with the land as specified in the Department's standards;

C. promulgate and establish standards and schedules to effect the purpose of this article;

D. order the posting of a performance bond or other undertaking either prior to or subsequent to the construction or operation of an industrial facility within Suffolk County on a case-by-case basis if evidence indicates such may be necessary to protect water resources from the adverse effects of operating such a facility.

E. Notwithstanding any other provision of this article, if the commissioner finds a condition which has the potential for contaminating the waters of the county with toxic or hazardous materials, or which otherwise constitutes an immediate danger to public health, and determines that it could appear prejudicial to the public interest to delay action, the commissioner may serve an order upon the permit holder, or if there is no permit upon the person in charge of the facility or site, citing such conditions and specifying the corrective action to be taken and a time period of less than fifteen (15) days within which such action shall be taken.

Such order may state that a permit is immediately suspended and/or that all operations are to be discontinued forthwith.

Any order requiring certain action or the cessation of certain activities immediately or within a specified period of less than fifteen (15) days shall provide such person an opportunity to be heard, which hearing shall be scheduled for a time no more than fifteen (15) days after the date the order is served."

Section 705. General Restrictions and Prohibitions

A. Construction of a Disposal System

1. It shall be unlawful for any person to construct, reconstruct, install or substantially modify any disposal system without first having obtained a permit therefor issued by or acceptable to the commissioner.

2. Section 705.A.1 does not apply to stormwater disposal systems unless there is an actual or potential discharge into the system of industrial wastes, toxic or hazardous materials, or sewage.

B. Discharge

1. It shall be unlawful for any person to discharge sewage, industrial wastes, offensive materials, toxic or hazardous materials or other wastes to any surface waters or groundwaters, to the surface of the ground or to a disposal system unless such discharge is specifically in accordance with a State Pollutant Discharge Elimination System (SPDES) Permit or other permit issued by or acceptable to the commissioner for that purpose.

2. No permits, as stipulated in Section 705.B.1, are required for the following types of discharges:

a. discharge of sewage from an existing residential structure to a private or individual sewage disposal system, or from any residential structure, houseboat or housebarge to a communal sewage system or municipal sewage system that does not contravene standards or result in a public health nuisance;

b. discharge of sewage from a commercial or industrial facility to a communal sewage system or municipal sewage system;

c. discharge of stormwater to a disposal system unless there is an actual or potential discharge into the system of industrial wastes or toxic or hazardous materials or sewage.

3. For existing discharges not prohibited by law prior to the effective date of this article, a permit shall be obtained within the time limits provided in Section 707.

C. Construction or Operation of a Treatment System

1. It shall be unlawful for any person to construct, modify or operate a treatment system without first obtaining a permit therefor issued by or acceptable to the commissioner.

D. Commingling

1. It shall be unlawful for any person to commingle stormwater runoff, cooling water, sewage or industrial wastes in any disposal system not approved for that purpose pursuant to this article.

E. Stormwater Discharges

1. It shall be unlawful for any person to develop or use land in such a manner as to cause stormwater runoff from that land to become contaminated and discharged in contravention of the other provisions of this article.

**Section 706. Deep Recharge Areas and
Water Supply Sensitive Areas**

The following additional restrictions and prohibitions shall apply in deep recharge areas and water supply sensitive areas.

A. It shall be unlawful for any person to discharge any restricted toxic or hazardous materials or to discharge industrial wastes from processes containing restricted toxic or hazardous materials to the groundwaters, to the surface of the ground, beneath the surface of the ground, to a municipal or communal sewage system, or to a disposal system except as follows:

1. application of fertilizers, pesticides or other agricultural chemicals approved for that purpose by the appropriate state and federal agencies; or

2. application of road surfacing or road construction materials or deicing salts to roadways, walkways, and parking areas; or

3. discharge from an establishment to a municipal or communal sewage system with effluent disposal to marine surface waters or recharge outside of the deep recharge areas and water supply sensitive areas, and the following minimum requirements are satisfied pursuant to a permit issued by or acceptable to the commissioner:

a. Dual plumbing systems shall be installed, one for the sanitary wastes and one for industrial wastes.

b. Sampling access approved by the administrative head of the municipal or communal sewage system and the Department shall be provided for both the sanitary and industrial waste systems.

c. The administrative head of the municipal or communal sewage system, with approval of the Department, shall determine which industrial wastes are acceptable to "hold and haul" and which require pretreatment prior to discharge to the collection system in order to assure compliance with the applicable sewer use ordinance.

d. Personnel authorized by the administrative head of the municipal or communal sewage system or other individual(s) acceptable to the commissioner, shall operate at each establishment its pretreatment facility for industrial wastes prior to discharge to the collection system.

e. Only batch pretreatment of industrial wastes will be permitted. Batch facilities and facilities for storage of drums containing toxic or hazardous wastes shall be located in an area accessible at all times by district personnel, in or adjacent to the industrial building, with heat and power provided by the owner.

f. Personnel authorized by the administrative head of the municipal or communal sewage system or other individual(s) acceptable to the commissioner, will be responsible for collection and disposal of pretreatment sludges, and other "hold and haul" materials.

g. The owner shall allow the personnel authorized by the administrative head of the municipal or communal sewage system or other individual(s) acceptable to the commissioner, access, from time to time, to wet process areas to perform their duties and inspections.

h. Industrial process-area floors shall be provided with adequate means to contain any spill of restricted toxic or hazardous materials. The design of containment facilities shall be subject to the approval of the commissioner.

i. A minimum of four (4) groundwater monitoring wells shall be installed at the owner's expense.

j. Financial assurance shall be provided to pay for cleanup of spills. This cost shall be entered as a judgment upon notice against the owner, occupant, tenant, or lessee responsible for such spill or spills.

B. It shall be unlawful to use or store any restricted toxic or hazardous materials on any premises except as follows:

1. a. the intended use of the product stored is solely for on-site heating, or intermittent stationary power production such as stand-by electricity generation or irrigation pump power; and

b. the facility for such storage is intended solely for the storage of kerosene, number 2 fuel oil, number 4 fuel oil, number 6 fuel oil, diesel oil or lubricating oil; and

c. the facility for such storage is constructed in accordance with the construction standards of Article 12 of the Suffolk County Sanitary Code for non-petroleum hazardous materials; and

d. the materials so stored are not industrial wastes from processes containing restricted toxic or hazardous materials; and

e. the materials stored are not intended for resale; or

2. a. the materials so stored are in containers where the total liquid capacity stored at any time does not exceed 250 gallons and where the dry storage in bags, bulk or small containers does not exceed 2,000 pounds; or

3. a. the materials so stored are intended solely for treatment or disinfection of water or sewage in treatment processes located at the site; or

4. a. the materials are stored solely incident to retail sales on premises and are not processed, pumped, packaged, or repackaged at the site; or

5. a. the materials are stored at a service station or similar installation solely incident to the distribution of gasoline, kerosene, diesel oil or other petroleum products for motor vehicular uses and repair; and

b. the facility for such storage is constructed in accordance with construction and monitoring standards of Article 12 of the Suffolk County Sanitary Code for non-petroleum hazardous materials; or

6. a. the materials are stored at an establishment for which a permit has been secured in accordance with Section 706.A.3, and a permit for such storage has been granted by the Department.

7. a. the materials are stored on a farm site solely incident to on-premises use, and consist of fertilizers, pesticides, or other agricultural chemicals to be applied in accordance with the provisions of Section 706.A.1.

C. The provisions of Sections 706.A and 706.B of this article shall be applicable:

1. immediately for all non-residential facilities which have not been approved, constructed, or put into operation prior to the effective date of this article; and

2. immediately for all non-residential facilities which were approved, constructed, or put into operation prior to the effective date of this article upon:

a. any change in use or process which results in an increase of mass loading in the discharge of restricted toxic or hazardous materials, or introduces a toxic or hazardous material not previously discharged; or

b. any change in use or process which results in an increase of the storage or change of type of restricted toxic or hazardous materials.

D. When upgraded in accordance with the time schedule specified in Article 12, existing facilities, including those for petroleum products, not otherwise covered by items 706.A, 706.B or 706.C, above, shall conform to the standards of Article 12 for non-petroleum hazardous materials. These requirements do not apply to facilities upgraded in accordance with Article 12 prior to the effective date of this article.

Section 707. Permits

A. All permits required by this article shall be applied for in accordance with the provisions of Article 3 of the Suffolk County Sanitary Code.

B. All persons required to obtain a permit by reason of any law, rule or regulation in effect prior to the effective date of this article shall be governed by such law, rule or regulation in determining when said permit shall be obtained.

C. All persons newly required to obtain a permit by this article due to any act or condition in existence as of the date this article becomes effective, shall apply for said permit within one (1) year of that date.

D. All persons required to obtain a permit by this article due to any act or condition not in existence on the effective date of this article must apply for and receive said permit prior to undertaking such act or creating such condition.

Section 708. Emergency Embargo; Seizure

A. In accordance with the general provisions of Article 2 of the Suffolk County Sanitary Code, the commissioner or his authorized agent is authorized to seize and embargo materials consisting of industrial wastes, toxic or hazardous materials, or any combination thereof when in the judgment of the commissioner, the nature and condition of said material constitutes an actual or potential hazard to the source of drinking water supply.

B. The following additional requirements shall also apply:

1. When materials are embargoed or seized pursuant to subsection A. above, they shall not be moved, used or removed except by or under the direction of an agent authorized by the commissioner.

2. It shall be unlawful for a person not authorized by the commissioner to remove or alter an embargo order or tag.

3. After having embargoed, condemned or otherwise seized materials pursuant to this section, the commissioner shall afford the owner of the seized material an opportunity to be heard at a hearing held within ninety-six (96) hours after the seizure. The commissioner may then vacate the order or sustain it and order a proper and safe disposition of the materials seized.

4. Unless ordered otherwise, removal shall be at the expense of the owner.

Section 709. Monitoring and Reporting

A. All persons maintaining subsurface leaching facilities and holding tanks for the purposes defined in Section 703.G shall make them accessible to representatives of the Department for sampling and monitoring purposes. The type of access shall be in conformance with the requirements of the commissioner.

B. All persons maintaining a discharge of industrial wastes, toxic or hazardous materials, and/or offensive materials pursuant to a permit issued by the commissioner must, at their own expense, monitor the discharge for such constituents at such intervals as specified in their permit.

1. The samples shall be collected in a manner prescribed by the Department, and analytical results shall be reported to the Department as specified in the permit.

2. The permittee may employ private laboratory facilities of its own choosing. However, the laboratory shall be approved by New York State Departments of Health or Environmental Conservation or other agency acceptable to the commissioner for the type of analyses performed.

3. Sampling shall be by an employee of the laboratory which prepares the analysis, and the laboratory shall be responsible for the accuracy and quality of the sample.

C. Owners, tenants and occupants of industrial facilities may be required to install monitoring systems, such as monitoring wells, both upgradient and downgradient in the groundwater flow. The number and location of the monitoring wells and their installation shall be in conformance with the requirements of the Department. The owner, tenant and occupant shall be responsible for all costs, as well as costs for groundwater monitoring and evaluation as required by the Department.

D. The owners of all real property used for non-residential purposes shall, within thirty (30) days of change, report in writing to the Department:

1. New Facility

a. Name of tenant or occupant; address, including tax map number.

b. Description of process, operation, or use.

2. Existing Facility

a. Name of new tenant or occupant; address, including tax map number; description of process, operation, or use.

b. Description of change of process, operation, or use.

This notification requirement shall not apply to changes in tenancy or occupancy of the space where a permit is not, or would not be, required for the use.

Section 710. Requirement to Connect to Public Sanitary Sewer

A. Sewage and industrial wastes from any building or premises shall be discharged directly into a municipal sewage system, if available and accessible. Discharge of industrial wastes to a municipal sewage system shall be in accordance with the applicable sewer use ordinance.

B. If there is no municipal sewage system or facility connecting therewith available and accessible, sewage from any new building or premises shall be discharged directly into a communal sewage system or a facility connecting with a communal sewage system, if available and accessible.

C. If there is no municipal or communal sewage system or facility connecting therewith available and accessible, a private sewage disposal system approved by the Department may be used.

D. In the event that a municipal or communal sewage system or facility connecting therewith becomes available and accessible, any building or premises shall be connected to such municipal or communal sewage system, and immediately thereafter the use of any other sewage disposal system or facility shall be discontinued.

Section 711. Abandonment of Disposal Systems

Existing disposal systems abandoned as a result of connection to municipal sewage systems or communal sewage systems or different disposal systems or for other reasons shall be removed or permanently sealed in a manner acceptable to the commissioner.

Section 712. Engineering Plans

A. All plans, specifications, and reports required by this article shall be prepared by a New York State licensed Professional Engineer unless otherwise prescribed in the New York State Education Law.

B. No permit to construct, reconstruct, modify, use or operate shall be issued without the prior submission of plans and/or reports acceptable to the commissioner.

Section 713. Operation of Sewage or Industrial Waste Treatment Facilities

A. All sewage and industrial waste treatment facilities shall be operated by a person or persons with qualifications acceptable to the commissioner.

B. An operator of a sewage or industrial waste treatment system shall be physically present at the sewage or industrial waste treatment plant he is responsible for operating for a period of time each day satisfactory to the commissioner.

C. This section does not apply to underground septic tank and leaching pool systems used for the disposal of domestic sewage.

Section 714. Enforcement

The provisions of this article shall be enforced in accordance with the enforcement provisions of Article 2 of the Suffolk County Sanitary Code.

Section 715. Appeals and Variances

In any case where an applicant for a permit or approval is dissatisfied with a determination of the authorized agent to act for the commissioner, or seeks a variance from the strict application of the letter of the requirements of this article, or standards promulgated pursuant to this article, he may appeal from the determination of the deputy or for consideration of his application to the Board of Review in accordance with the provisions of Article 2 of the Suffolk County Sanitary Code.

Section 716. Separability of Provisions

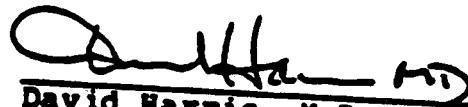
In the event that any provision of this article is declared unconstitutional or invalid, or the application thereof to any person or circumstance is held invalid, the applicability of such provision to other persons and circumstances and the constitutionality or validity of every other provision of this article shall not be affected thereby.

CERTIFICATION

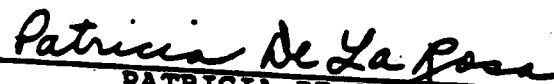
STATE OF NEW YORK)
COUNTY OF SUFFOLK)

I, David Harris, M.D., M.P.H., Commissioner of the Suffolk County Department of Health Services, and Chairman of the Suffolk County Board of Health, do hereby certify that the foregoing Article 7 "Water Pollution Control" of the Suffolk County Sanitary Code, as amended, has been adopted by the Board of Health at its regular meeting held in Hauppauge, New York, on April 9, 1986, and that the same is a true and complete copy of said article published by authority and order and under the direction of the said Suffolk County Department of Health Services.

IN WITNESS WHEREOF, I have
hereunto set my hand on this
24 day of April, 1986.


David Harris, M.D., M.P.H.
Commissioner, Suffolk County
Department of Health Services

Subscribed and sworn to before me
this 24 day of April 1986.

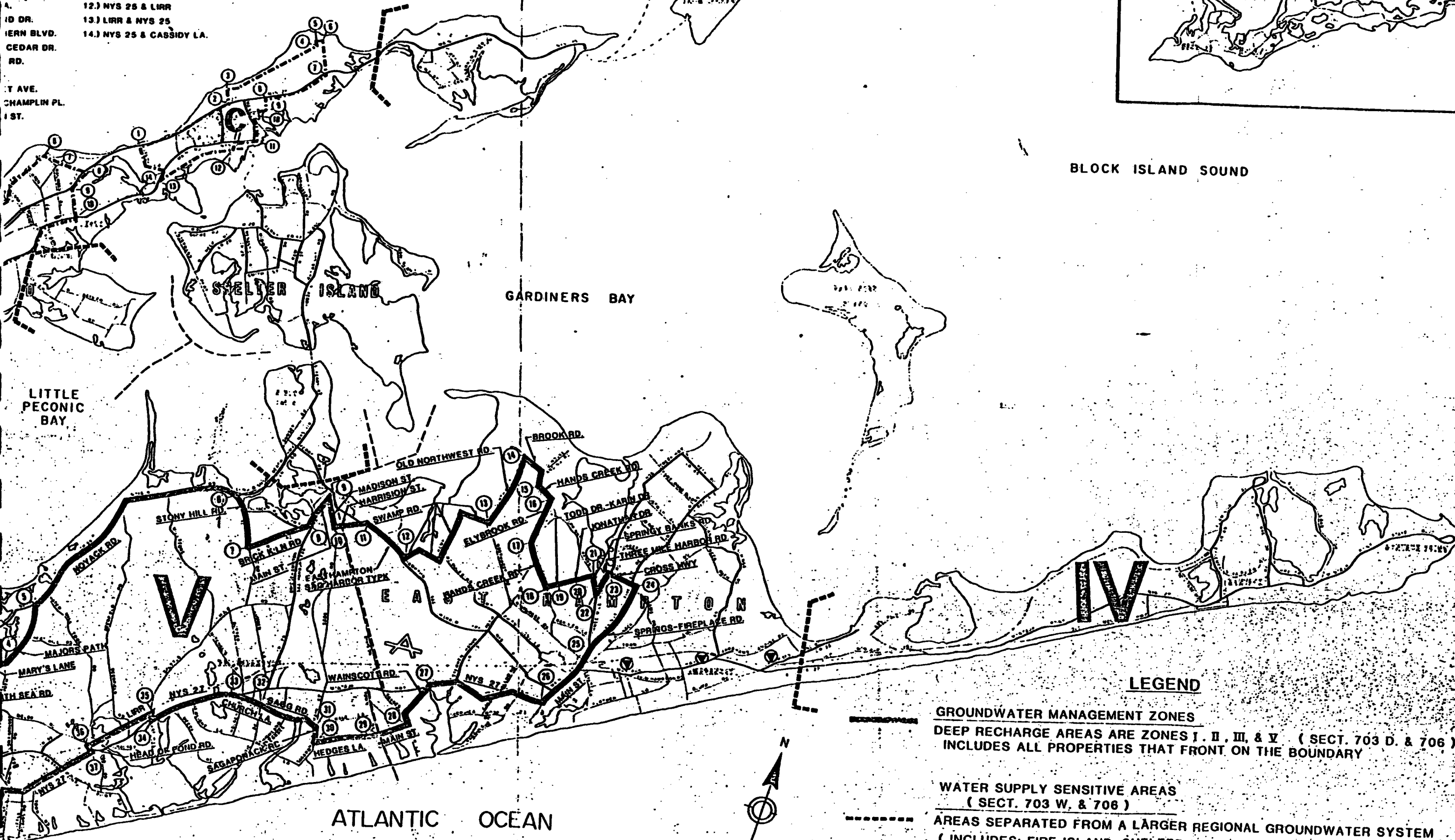

PATRICIA DE LA ROSA
NOTARY PUBLIC, State of New York
Suffolk County, No. 4748964
Commission Expires March 30, 1987

C

27
A.
ID DR.
IERN BLVD.
CEDAR DR.
RD.

T AVE.
CHAMPLIN PL.
I ST.

11.) MAIN ST. & NYS 25
12.) NYS 25 & LIRR
13.) LIRR & NYS 25
14.) NYS 25 & CASSIDY LA.



BLOCK ISLAND SOUND

GARDINERS BAY

LITTLE PECONIC BAY

SHELTER ISLAND

V

IV

ATLANTIC OCEAN

ZONE V

LEGEND

- GROUNDWATER MANAGEMENT ZONES
- DEEP RECHARGE AREAS ARE ZONES I, II, III, & V (SECT. 703 D. & 706) - INCLUDES ALL PROPERTIES THAT FRONT ON THE BOUNDARY
- WATER SUPPLY SENSITIVE AREAS (SECT. 703 W. & 706)
- AREAS SEPARATED FROM A LARGER REGIONAL GROUNDWATER SYSTEM (INCLUDES: FIRE ISLAND, SHELTER ISLAND, FISHERS ISLAND, GILGO / OAK BEACH)
- WATER BUDGET AREA OF THE NORTH FORK
- WELLFIELD OUTSIDE OF DEEP RECHARGE AREA OR OTHER

III

- 22.) EASTPORT RD. & SUNRISE HWY.
- 23.) SUNRISE HWY. & MIDDLE ISLAND RD.
- 24.) MIDDLE ISLAND RD. & LIRR
- 25.) LIRR & CR 101
- 26.) CR 101 & SOUTHAVEN AVE.
- 27.) SOUTHAVEN AVE. & MEDFORD AVE.
- 28.) MEDFORD AVE. & CEDAR AVE.
- 29.) CEDAR AVE. & N. OCEAN AVE.
- 30.) N. OCEAN AVE. & FISK RD.
- 31.) FISK RD. & JAMAICA AVE.
- 32.) JAMAICA AVE. & BLUE POINT RD.
- 33.) BLUE POINT RD. & LIE

- 34.) LIE & NICOLLS RD.
- 35.) NICOLLS RD. & SUNRISE HWY.
- 36.) SUNRISE HWY. & CONNETQUOT AVE.
- 37.) CONNETQUOT AVE. & LOWELL AVE.
- 38.) LOWELL AVE. & LIRR
- 39.) LIRR & SAGTIKOS PKWY.
- 40.) SAGTIKOS PKWY. & SONIA RD.
- 41.) SONIA RD. & S. 4th ST.
- 42.) S. 4th ST. & UDALL RD.
- 43.) UDALL RD. & GRAND BLVD.
- 44.) GRAND BLVD. & LIRR
- 45.) LIRR & NASSAU-SUFFOLK CTY. LINE

B

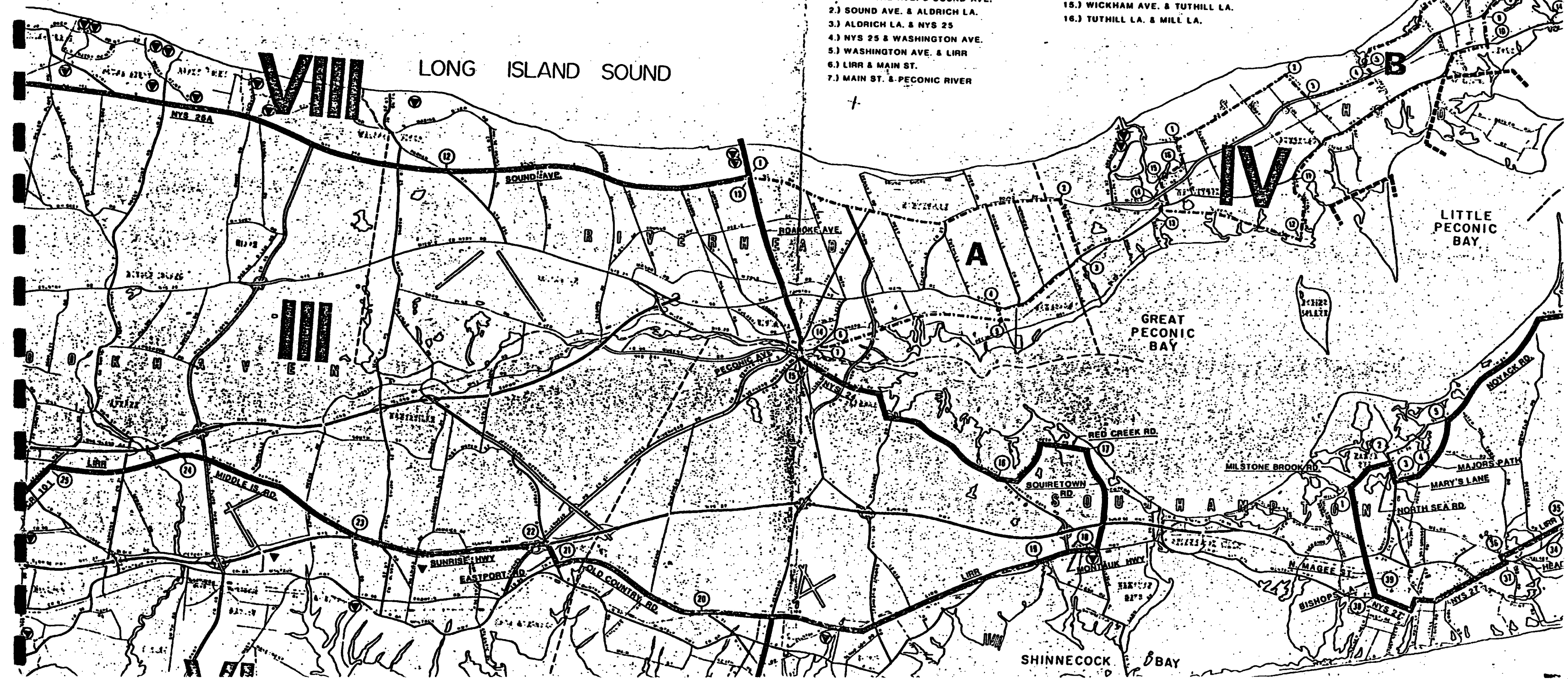
- 1.) MILL LA. & OREGON RD.
- 2.) OREGON RD. & BRIDGE LA.
- 3.) BRIDGE LA. & CR 27
- 4.) CR 27 & PECONIC LA.
- 5.) PECONIC LA. & SOUND VIEW AVE.
- 6.) SOUND VIEW AVE. & LIGHTHOUSE RD.
- 7.) LIGHTHOUSE RD. & NORTH RD.
- 8.) NORTH RD. & CR 27
- 9.) CR 27 & BOISSEAU AVE.
- 10.) BOISSEAU AVE. & RTE. 25
- 11.) RTE. 25 & NEW SUFFOLK RD.
- 12.) NEW SUFFOLK RD. & SUFFOLK AVE.
- 13.) SUFFOLK AVE. & NYS 25
- 14.) NYS 25 & WICKHAM AVE.
- 15.) WICKHAM AVE. & TUTHILL LA.
- 16.) TUTHILL LA. & MILL LA.

C

- 1.) CASSIDY LA. & CR 27
- 2.) CR 27 & McCANN LA.
- 3.) McCANN LA. & SOUND DR.
- 4.) SOUND DR. & SOUTHERN BLVD.
- 5.) SOUTHERN BLVD. & CEDAR DR.
- 6.) CEDAR DR. & STARS RD.
- 7.) STARS RD. & NYS 25
- 8.) NYS 25 & MANHASSET AVE.
- 9.) MANHASSET AVE. & CHAMPLIN PL.
- 10.) CHAMPLIN PL. & MAIN ST.
- 11.) MAIN ST. &
- 12.) NYS 25 &
- 13.) LIRR & NYS
- 14.) NYS 25 &

A

- 1.) ROANOKE AVE. & SOUND AVE.
- 2.) SOUND AVE. & ALDRICH LA.
- 3.) ALDRICH LA. & NYS 25
- 4.) NYS 25 & WASHINGTON AVE.
- 5.) WASHINGTON AVE. & LIRR
- 6.) LIRR & MAIN ST.
- 7.) MAIN ST. & PECONIC RIVER

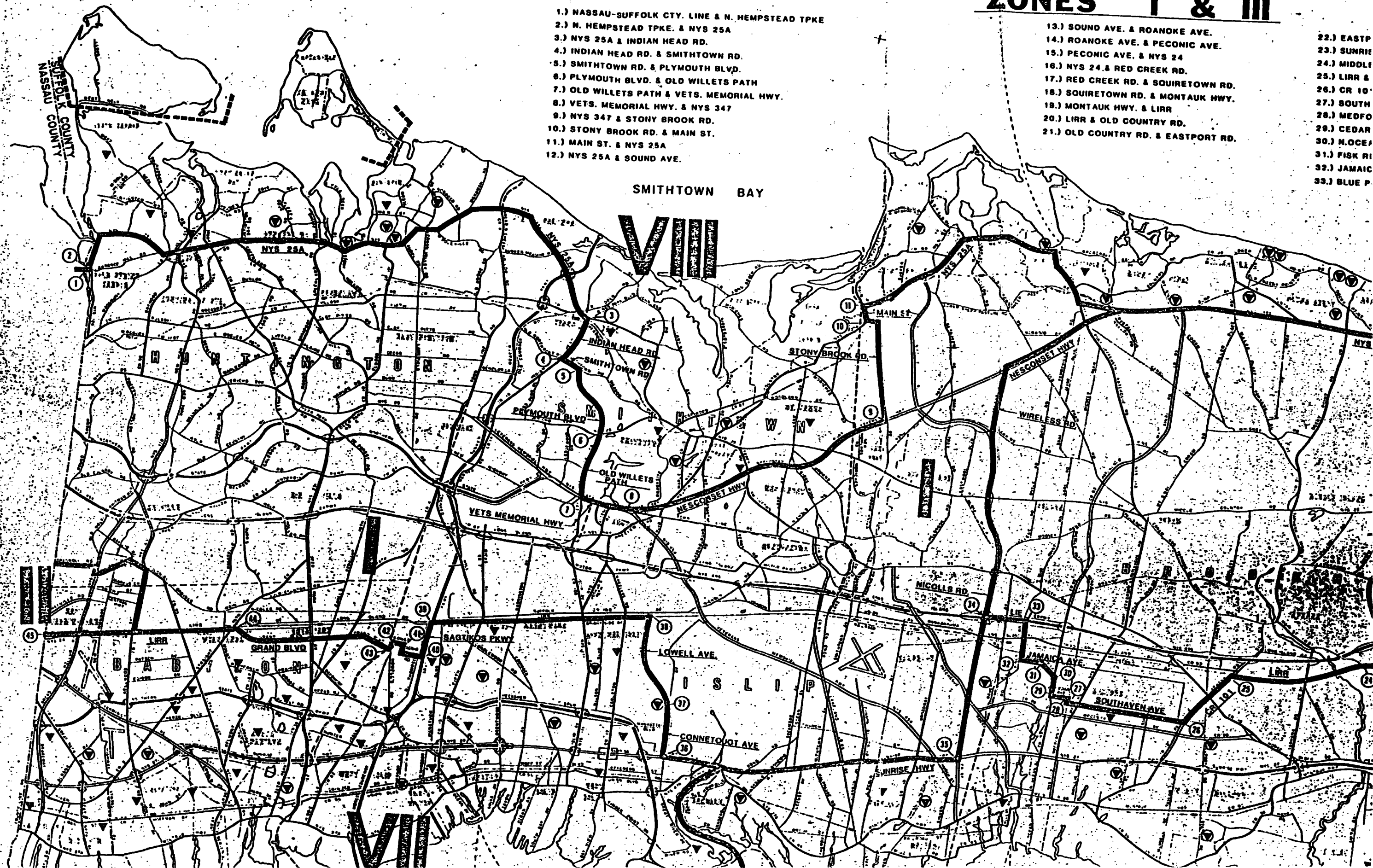


ZONES I & III

- 1.) NASSAU-SUFFOLK CTY. LINE & N. HEMPSTEAD TPKE
- 2.) N. HEMPSTEAD TPKE. & NYS 25A
- 3.) NYS 25A & INDIAN HEAD RD.
- 4.) INDIAN HEAD RD. & SMITHTOWN RD.
- 5.) SMITHTOWN RD. & PLYMOUTH BLVD.
- 6.) PLYMOUTH BLVD. & OLD WILLETS PATH
- 7.) OLD WILLETS PATH & VETS. MEMORIAL HWY.
- 8.) VETS. MEMORIAL HWY. & NYS 347
- 9.) NYS 347 & STONY BROOK RD.
- 10.) STONY BROOK RD. & MAIN ST.
- 11.) MAIN ST. & NYS 25A
- 12.) NYS 25A & SOUND AVE.

- 13.) SOUND AVE. & ROANOKE AVE.
- 14.) ROANOKE AVE. & PECONIC AVE.
- 15.) PECONIC AVE. & NYS 24
- 16.) NYS 24 & RED CREEK RD.
- 17.) RED CREEK RD. & SQUIRETOWN RD.
- 18.) SQUIRETOWN RD. & MONTAUK HWY.
- 19.) MONTAUK HWY. & LIRR
- 20.) LIRR & OLD COUNTRY RD.
- 21.) OLD COUNTRY RD. & EASTPORT RD.

- 22.) EASTP
- 23.) SUNRIE
- 24.) MIDDLE
- 25.) LIRR &
- 26.) CR 10
- 27.) SOUTH
- 28.) MEDFO
- 29.) CEDAR
- 30.) N.OCEA
- 31.) FISK RI
- 32.) JAMAIC
- 33.) BLUE P.



REFERENCE NO. 16

REFERENCE NO. 17

Memo

To GOPA NAIR

Date 6-18-96

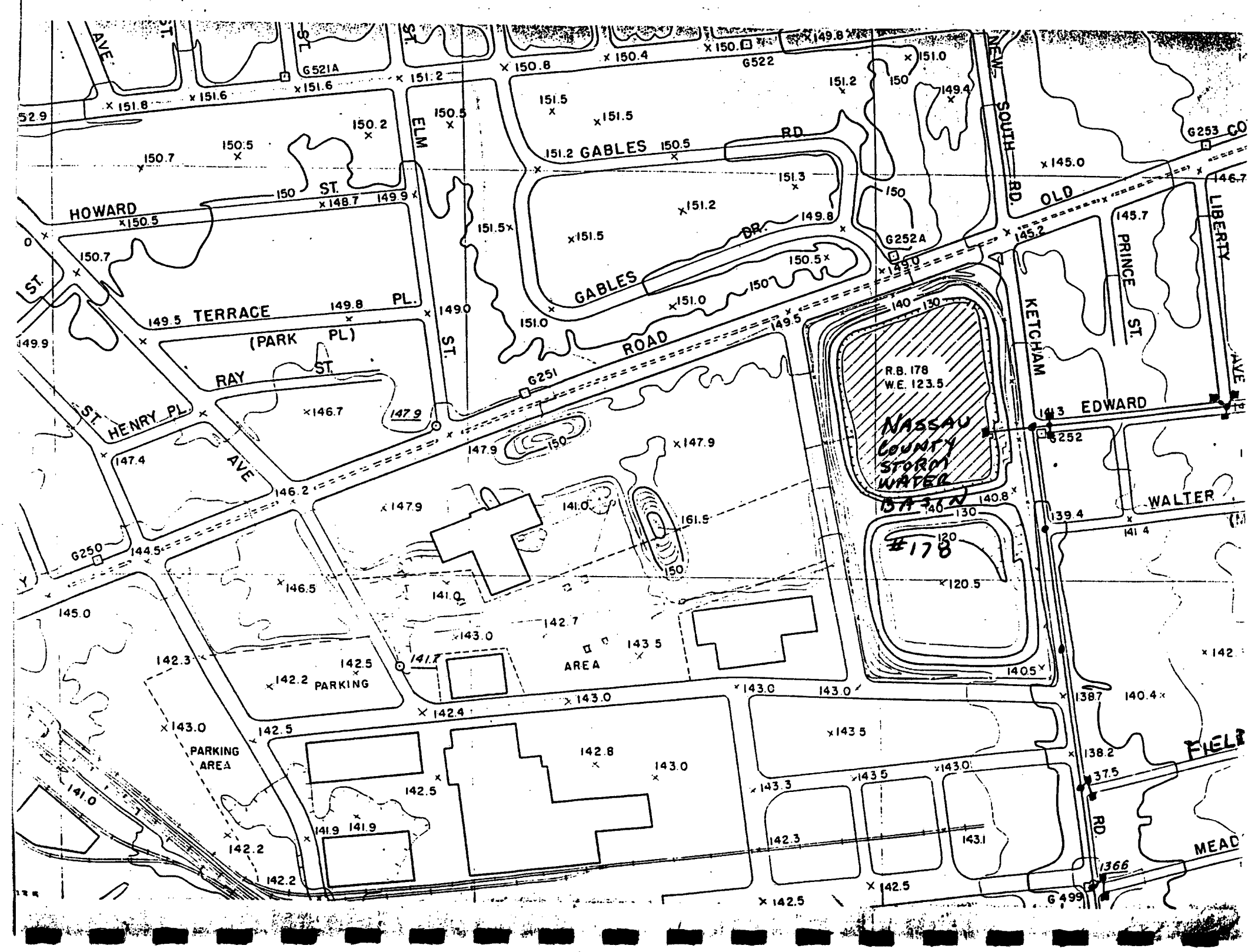
From BRIAN SCHNEIDER

AS REQUESTED, ENCLOSED IS
A MAP SHOWING PARTIAL
DRAINAGE AREA OF RECHARGE
BASIN # 178.

RECEIVED
JUL 3 1996



GS - 5039 - 1/9/67



REFERENCE NO. 18

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

TOWN OF
OYSTER BAY,
NEW YORK
NASSAU COUNTY

MAP INDEX

PANELS PRINTED: 8, 9, 22, 24, 25,
26, 27, 28, 29, 36, 37, 38, 39, 63

COMMUNITY-PANEL NUMBERS
360483 0001-0065

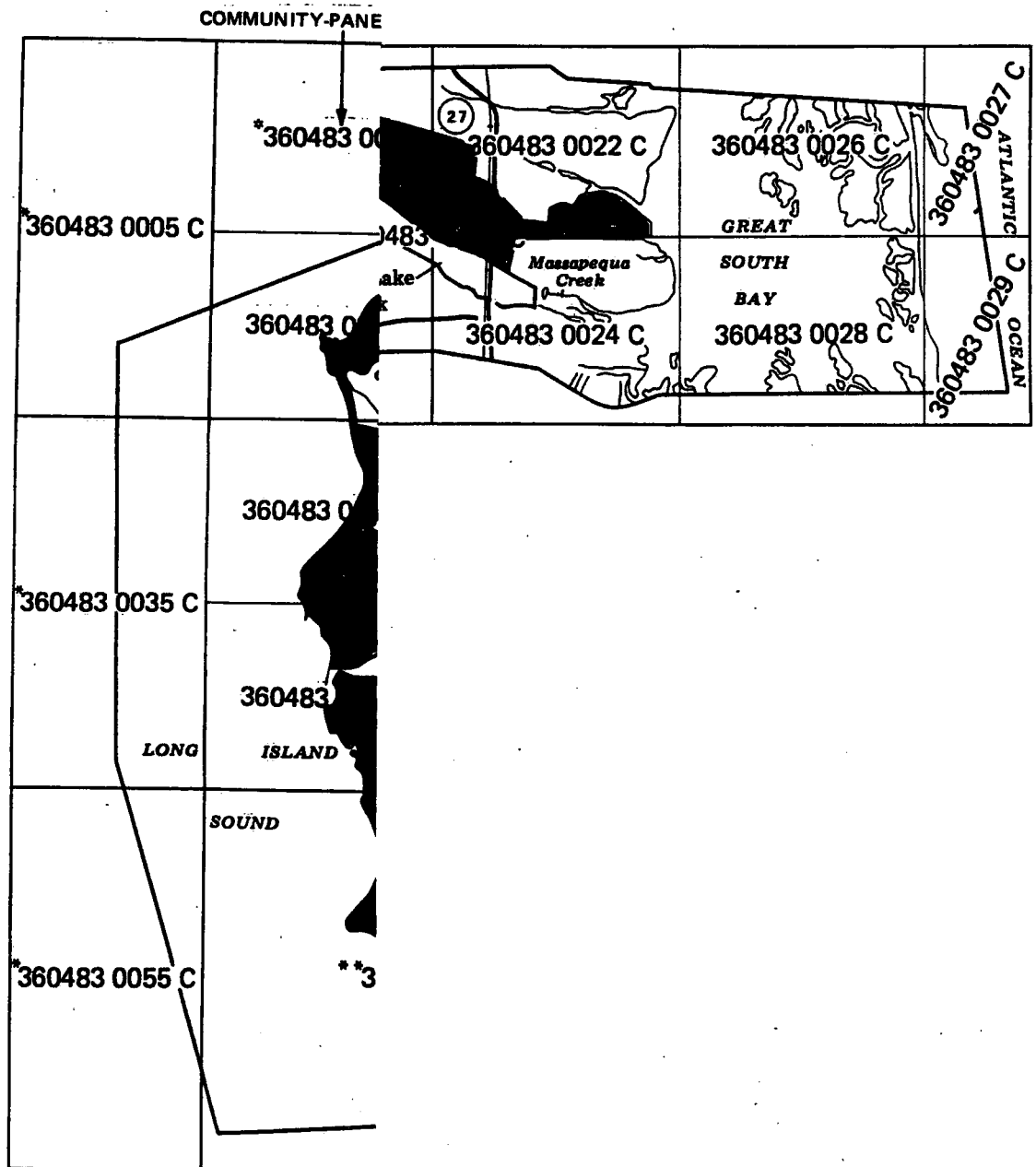
MAP REVISED:
MAY 18, 1992



Federal Emergency Management Agency

LEGEND

AREA NOT INCI



*PANEL NOT PRINTED— OPEN WATER
 **PANEL NOT PRINTED—AREA IN ZON
 ***PANEL NOT PRINTED—AREA NOT IN
 ****PANEL NOT PRINTED—AREA OUTSIDE

REFERENCE NO. 19

N.Y.S. DEPARTMENT OF ENVIRONMENTAL CONSERVATION
NASSAU COUNTY DEPARTMENT OF HEALTH

SEQNC NO: 1-R-0150
RUN DATE: 01/03/89

82400 2476 00004 W I

LOCATION FAC EP

CERTIFICATE TO OPERATE AN AIR CONTAMINATION SOURCE
PROCESS, EXHAUST OR VENTILATION SYSTEM UNIT
RENEWAL APPLICATION

OWNER SERVO CORP OF AMER 111 NEW SOUTH RD HICKSVILLE (4) NY 11802	FACILITY (6) SERVO CORP OF AMER (7) 111 NEW SOUTH RD (8) HICKSVILLE (9) 11802 (10) REP: MR HILLENBROCK 938-9700	(11) CONFIDENTIAL STATUS NON-CONFIDN (12) APPLICATION STATUS IN COMPLIAN DATE OF LAST CHANGE 03/22/88 PRIOR CO ISSUE DATE 04/16/88 PRIOR CO EXPIRATION DATE 04/15/89
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SSION (41)UTH-E: 626.1 KM. (42)STACK HEIGHT: 17 FT. (43)EXIT VELOCITY: 24.90 FT/SEC (44)SIC: 3620 (45)AGENCY-CODE-1: C (COUNT
 POINT (46)UTH-N: 513.1 KM. (47)HT ABV STRUC: 1 FT. (48)EXIT FLOW: 3940.00 ACFM (49)CO FEE: 950.00 (50)AGENCY-CODE-2: C (COUNT
 00004 (51)GRND ELEV: 120 FT. (52)STK DIAM: 22 IN. (53)EXIT TEMP: 70 DEGR F (54)CO CONDITIONS: 1

LI (55)HOURS/DAY: 8.0 (56)DAYS/YEAR: 260 (57)% OP BY SEASON: 25 25 25 25 (58)SOURCE CODE: A1203 DEGREASING AND CLEAN
 (59)BLDG: MAIN (60)FLOOR NAME: 1 (61)RULE 1: 226.00 (62)RULE 2:

CESS/UNIT (72)DESCRIPTION
 1. METALLIC PORTION TO BE SOLDERED
 2. IS CLEANED INSIDE THIS DEGREASER TANK
 3. MEDIUM USED IS FREON TMC
 4. EMISSION FROM TANK IS MANIFOLDED BY
 5. MEANS OF HOOD WITH ROOM AIR

FROL (73)TYPE: 001 FAN (74)MFG: ILG VENT CO MODEL LCRF182 (75)ID: 01 (76)DATE INSTALLED: 01/66
 IPMENT (77)DISPOSAL METHOD: 09 OTHER (78)USEFUL LIFE: 10 YEARS

CONTAMINANTS	CAS NUMBER	ENV RATING	EMISSIONS				% CONTROL EFFICIENCY	HRLY ACTUAL LBS/HOUR	ANNUAL EMISSIONS (LBS/YEAR)		
			ACTUAL	UNIT	HOW DET	PERMISSIBLE			ACTUAL	10*	PERMISSIBLE
✓ 12	(085) 00075-71-8	(086) D	(087) 4.200	(088) 01	(089) 06	(090) 4.200	(091)	(092) 4.200	(093) 8736	(094) 0	(095) 87

CIAL (151)CONDITION 1. AAL COMPLIANCE
 DITIONS

PRIOR COMMENTS (16)BY 816CAP (17)DATE 02/15/85 10:30AM OPER SATIS	(18)CURRENT COMMENTS (19)BY <u>816CAP</u> 1. <u>1000 AM OPER SATIS</u> 2. _____ 3. _____ 4. _____ 5. _____	(20)DATE <u>03/16/89</u> (27)LAST INSPECTION DATE <u>03/16/89</u> (21)INSPECTION STATUS <u>5</u> (22)DATE OF NEXT ACTION <u>1/1/90</u> (23)ISSUE DATE <u>04/16/89</u> (24)EXPIRATION DATE <u>04/15/90</u> (25)CO FEE <u>100</u>
--	---	---

REP'S SIGNATURE: 

DATE: 3/16/89

ISSUING OFFICER'S SIGNATURE:

DATE:

JAN 25 1990

N.Y.S. DEPARTMENT OF ENVIRONMENTAL CONSERVATION
NASSAU COUNTY DEPARTMENT OF HEALTH

SEQNC NO: 1-R-015
RUN DATE: 01/03/89

82400 2476 00008 W I
LOCATION FAC EP

CERTIFICATE TO OPERATE AN AIR CONTAMINATION SOURCE
PROCESS, EXHAUST OR VENTILATION SYSTEM UNIT
RENEWAL APPLICATION

OWNER
SERVO CORP OF AMER
111 NEW SOUTH RD
HICKSVILLE (4) NY
11802

FACILITY
(6) SERVO CORP OF AMER
(7) 111 NEW SOUTH RD
(8) HICKSVILLE (9) 11802
(10) REP: MR WILLENBROCK 938-9700

(11) CONFIDENTIAL STATUS NON-CONFID
(12) APPLICATION STATUS IN COMPLIA
DATE OF LAST CHANGE 03/22/88
PRIOR CO ISSUE DATE 04/16/88
PRIOR CO EXPIRATION DATE 04/15/89

SION (41)UTH-E: 626.1 KM. (42)STACK HEIGHT: 21 FT. (43)EXIT VELOCITY: 70.00 FT/SEC (44)SIC: 3620 (45)AGENCY-CODE-1: C (COUNTY)
POINT (46)UTH-N: 513.1 KM. (47)HT ABV STRUC: 4 FT. (48)EXIT FLOW: 4500.00 ACFM (49)CO FEE: \$25.00 (50)AGENCY-CODE-2: C (COUNTY)
0000 (51)GRND ELEV: 120 FT. (52)STK DIAM: 14 IN. (53)EXIT TEMP: 160 DEGR F (54)CO CONDITIONS: 1
I (55)HOURS/DAY: 3.0 (56)DAYS/YEAR: 250 (57)% OP BY SEASON: 25 25 25 25 (58)SOURCE CODE: A1402 BAKING AND DRYING (0
(59)BLDG: MAIN (60)FLOOR NAME: 1 (61)RULE 1: 212.00 (62)RULE 2:
ESS/UNIT (72)DESCRIPTION 1. MATERIALS PAINTED IN PAINT SPRAY BOOTHS ARE PLACED
RIPTION 2. IN ELECT HEATED OVEN TO ENHANCE DRYING OF PAINT
ROL (73)TYPE: 001 FAN (74)MFG: G ARDEN (75)ID: 01 (76)DATE INSTALLED: 01/59
PMENT (77)DISPOSAL METHOD: (78)USEFUL LIFE: 10 YEARS

AMINANTS	CAS NUMBER	ENV RATING	E M I S S I O N S				% CONTROL EFFICIENCY	HRLY ACTUAL LBS/HOUR	ANNUAL EMISSIONS (LBS/YEAR)		
			ACTUAL	UNIT	HOW DET	PERMISSIBLE			ACTUAL	10*	PERMISSIBLE
ORGANIC SOLVE	(085) NY998-00-0	(086) D	(087) .200	(088) 01	(089)	(090) .200	(091)	(092) .200	(093)150.000	(094) 0	(095)150.0

IAL (151)CONDITION 1. AG1 COMPLIANCE
ITIONS

(151) 228 COMPLIANCE REQUIRED

RIOR COMMENTS (16)BY 816CAP (17)DATE 02/15/85
:30AM OPER SATIS

(18)CURRENT COMMENTS (19)BY 816 CAP (20)DATE 03/16/89
1. (06) 228
2.
3.
4.
5.

(27)LAST INSPECTION DATE 03/16/89
(21)INSPECTION STATUS
(22)DATE OF NEXT ACTION 10/15/89
(23)ISSUE DATE 1/1
(24)EXPIRATION DATE 1/1
(25)CO FEE 50

REP'S SIGNATURE:

DATE: 3/16/89

ISSUING OFFICER'S SIGNATURE:

DATE:

JAN 25 1990

N.Y.S. DEPARTMENT OF ENVIRONMENTAL CONSERVATION
NASSAU COUNTY DEPARTMENT OF HEALTH

SEQNC NO: 1-X-0281
RUN DATE: 10/02/89

82400 2476 00005 W I

LOCATION FAC EP

PROCESS, EXHAUST OR VENTILATION SYSTEM UNIT
ACTION DUE NOTICE

OWNER SERVO CORP OF AMER 111 NEW SOUTH RD HICKSVILLE (4) NY 11802	FACILITY (6) SERVO CORP OF AMER (7) 111 NEW SOUTH RD (8) HICKSVILLE (9) 11802 (10) REP: MR WILLENBROCK 938-9700	(11) CONFIDENTIAL STATUS NON-CONFIDENT (12) APPLICATION STATUS PC/CO EXPIRE DATE OF LAST CHANGE 05/22/89 (13) PRIOR CO ISSUE DATE 04/16/88 (14) PRIOR CO EXPIRATION DATE 04/15/89
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(41) UTM-E: 626.1 KM. (42) STACK HEIGHT: 20 FT. (43) EXIT VELOCITY: 43.00 FT/SEC (44) SIC: 3620 (45) AGENCY-CODE-1: C (COUNTY)
 (46) UTM-N: 513.1 KM. (47) HT ABV STRUC: 1 FT. (48) EXIT FLOW: 5625.00 ACFM (49) CO FEE: \$50.00 (50) AGENCY-CODE-2: C (COUNTY)
 (51) GRND ELEV: 120 FT. (52) STK DIAM: 20 IN. (53) EXIT TEMP: 70 DEGR F (54) CO CONDITIONS: 1

(55) HOURS/DAY: 3.0 (56) DAYS/YEAR: 250 (57) % OP BY SEASON: 25 25 25 25 (58) SOURCE CODE: A1305 PAINT SPRAYING (GROUP)
 (59) BLDG: MAIN (60) FLOOR NAME: 1 (61) RULE 1: 228.00 (62) RULE 2: 212.00

(72) DESCRIPTION 1. SPRAY PAINTING OF METAL PANELS

(73) TYPE: 001 FAN (74) MFG: UNKNOWN (75) ID: 01 (76) DATE INSTALLED: 01/59
 (77) DISPOSAL METHOD: (78) USEFUL LIFE: 10 YEARS

CONTAMINANTS	CAS NUMBER	ENV RATING	EMISSIONS				% CONTROL EFFICIENCY	HRLY ACTUAL LBS/HOUR	ANNUAL EMISSIONS (LBS/YEAR)		
			ACTUAL	UNIT	HOW DET	PERMISSIBLE			ACTUAL	10x	PERMISSIBLE
ACETALDEHYDE	(085) NY075-00-0	(086) D	(087) .140	(088) 01	(089) 06	(090) .140	(091)	(092) .140	(093) 105.000	(094) 0	(095) 105.000
BENZENE, O&P MIXT.	(096) 01330-20-7	(097) D	(098) .440	(099) 01	(100) 06	(101) .440	(102)	(103) .440	(104) 330.000	(105) 0	(106) 330.000
ETHYLENE GLYCOL	(107) NY990-00-0	(108) D	(109) .310	(110) 01	(111) 06	(112) .310	(113)	(114) .310	(115) 232.500	(116) 0	(117) 232.500
METHANOL	(118) NY580-00-0	(119) D	(120) .030	(121) 01	(122) 06	(123) .030	(124)	(125) .030	(126) 22.500	(127) 0	(128) 22.500

(151) CONDITION 1. PART 228 COMPLIANCE REQUIRED

PRIOR COMMENTS (16) BY 816CAP (17) DATE 03/16/89 0:00AM PART 228 COMPLIANCE REQUIRED	(18) CURRENT COMMENTS (19) BY _____ (20) DATE ____/____/____ 1. _____ 2. _____ 3. _____ 4. _____ 5. _____	(27) LAST INSPECTION DATE ____/____/____ (21) INSPECTION STATUS 4 (22) DATE OF NEXT ACTION 10/15/90
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N.Y.S. DEPARTMENT OF ENVIRONMENTAL CONSERVATION
NASSAU COUNTY DEPARTMENT OF HEALTH

SEQNC NO: 1-X-0282

RUN DATE: 10/02/89

82400 2476 00005 W I

LOCATION FAC EP

T O X I C I T Y A N A L Y S I S

OWNER SERVO CORP OF AMER 111 NEW SOUTH RD HICKSVILLE (4) NY 11802	FACILITY (6) SERVO CORP OF AMER (7) 111 NEW SOUTH RD (8) HICKSVILLE (9) 11802 (10) REP: MR WILLENBROCK 938-9700	(11) CONFIDENTIAL STATUS NON-CONFIDNT (12) APPLICATION STATUS PC/CO EXPIRE DATE OF LAST CHANGE 05/22/89 (13) PRIOR CO ISSUE DATE 04/16/88 (14) PRIOR CO EXPIRATION DATE 04/15/89
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SECTION	(41)UTH-E: 626.1 KM.	(42)STACK HEIGHT: 20 FT.	(43)EXIT VELOCITY: 43.00 FT/SEC	RATIO STK HT / BLDG HT: 1.05
POINT	(46)UTH-N: 513.1 KM.	(47)HT ABV STRUC: 1 FT.	(48)EXIT FLOW: 5625.00 ACFM	PLUME RISE: NA FT.
00005	(51)GRND ELEV: 120 FT.	(52)STK DIAM: 20 IN.	(53)EXIT TEMP: 70 DEGR F	EFFECTIVE STACK HEIGHT: 20.00 FT.

CONTAMINANTS	CAS NUMBER	E M I S S I O N S			% CONTROL EFFICIENCY	HRLY ACTUAL LBS/HOUR	A A L D A T A (UG/M3)			MAX CALC AMB LEVEL	REMARKS
		ACTUAL	UNIT	PERMISSIBLE			AAL	TOXIC LVL	SOURCE		
ACULATES	(085) NY075-00-0	(087) .140	(088) 01	(090) .140	(091)	(092) .140					
IE,M,O&P MIXT.	(096) 01330-20-7	(098) .440	(099) 01	(101) .440	(102)	(103) .440	1450	MODERATE	NYS DEC	2	
LLANEOUS ORG	(107) NY990-00-0	(109) .310	(110) 01	(112) .310	(113)	(114) .310					
IATIC ALCOHOL	(118) NY580-00-0	(120) .030	(121) 01	(123) .030	(124)	(125) .030					

N.Y.S. DEPARTMENT OF ENVIRONMENTAL CONSERVATION
NASSAU COUNTY DEPARTMENT OF HEALTH

SEQNC NO: 1-X-0283
RUN DATE: 10/02/89

82400 2476 00006 W I

LOCATION FAC EP

PROCESS, EXHAUST OR VENTILATION SYSTEM UNIT
ACTION DUE NOTICE

OWNER SERVO CORP OF AMER 111 NEW SOUTH RD HICKSVILLE (4) NY 11802	FACILITY (6) SERVO CORP OF AMER (7) 111 NEW SOUTH RD (8) HICKSVILLE (9) 11802 (10) REP: MR WILLENBROCK 938-9700	(11) CONFIDENTIAL STATUS NON-CONFIDENTIAL (12) APPLICATION STATUS PC/CO EXPIRE DATE OF LAST CHANGE 05/22/89 (13) PRIOR CO ISSUE DATE 04/16/88 (14) PRIOR CO EXPIRATION DATE 04/15/89
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SSION POINT 00006	(41) UTM-E: 626.1 KM. (46) UTM-N: 513.1 KM. (51) GRND ELEV: 120 FT.	(42) STACK HEIGHT: 20 FT. (47) HT ABV STRUC: 3 FT. (52) STK DIAM: 20 IN.	(43) EXIT VELOCITY: 48.00 FT/SEC (48) EXIT FLOW: 6300.00 ACFM (53) EXIT TEMP: 70 DEGR F	(44) SIC: 3620 (49) CO FEE: \$50.00 (54) CO CONDITIONS: 1	(45) AGENCY-CODE-1: C (COUNTY) (50) AGENCY-CODE-2: C (COUNTY)
TI	(55) HOURS/DAY: 5.0 (59) BLDG: MAIN	(56) DAYS/YEAR: 250 (60) FLOOR NAME: 1	(57) % OP BY SEASON: 25 25 25 25	(58) SOURCE CODE: A1305 (61) RULE 1: 228.00	PAINT SPRAYING (GROUP) (62) RULE 2: 212.00

PROCESS/UNIT (72) DESCRIPTION 1. SPRAY PAINTING OF CABINETS
DESCRIPTION

TROL IPMENT	(73) TYPE: 001 FAN (74) MFG: UNKNOWN (77) DISPOSAL METHOD:	(75) ID: 01 (76) DATE INSTALLED: 01/59 (78) USEFUL LIFE: 10 YEARS
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POLLUTANTS	CAS NUMBER	ENV RATING	E M I S S I O N S				% CONTROL EFFICIENCY	HRLY ACTUAL LBS/HOUR	ANNUAL EMISSIONS (LBS/YEAR)		
			ACTUAL	UNIT	HOW DET	PERMISSIBLE			ACTUAL	10x	PERMISSIBLE
ACULATES	(085) NY075-00-0	(086) D	(087) .130	(088) 01	(089) 06	(090) .130	(091)	(092) .130	(093) 162.500	(094) 0	(095) 162.500
VE,M,O&P MIXT.	(096) 01330-20-7	(097) D	(098) .480	(099) 01	(100) 06	(101) .480	(102)	(103) .480	(104) 600.000	(105) 0	(106) 600.000
ELLANEUS ORG	(107) NY990-00-0	(108) D	(109) .340	(110) 01	(111) 06	(112) .340	(113)	(114) .340	(115) 425.000	(116) 0	(117) 425.000
IATIC ALCOHOL	(118) NY580-00-0	(119) D	(120) .040	(121) 01	(122) 06	(123) .040	(124)	(125) .040	(126) 50.000	(127) 0	(128) 50.000

CONDITIONS (151) CONDITION 1. PART 228 COMPLIANCE REQUIRED

PRIOR COMMENTS (16) BY 816CAP (17) DATE 03/16/89
10:00AM PART 228 COMPLIANCE REQUIRED

(18) CURRENT COMMENTS (19) BY _____ (20) DATE 1/1
1. _____
2. _____
3. _____
4. _____
5. _____

(27) LAST INSPECTION DATE 1/1
(21) INSPECTION STATUS 4
(22) DATE OF NEXT ACTION 10/15/90

N.Y.S. DEPARTMENT OF ENVIRONMENTAL CONSERVATION
NASSAU COUNTY DEPARTMENT OF HEALTH

SEQNC NO: 1-X-0284
RUN DATE: 10/02/89

282400 2476 00006 W I

LOCATION FAC EP

T O X I C I T Y A N A L Y S I S

OWNER	FACILITY	(11) CONFIDENTIAL STATUS	NON-CONFIDENT
(1) SERVO CORP OF AMER	(6) SERVO CORP OF AMER	(12) APPLICATION STATUS	PC/CO EXPIRE
(2) 111 NEW SOUTH RD	(7) 111 NEW SOUTH RD	DATE OF LAST CHANGE	05/22/89
(3) HICKSVILLE (4) NY	(8) HICKSVILLE (9) 11802	(13) PRIOR CO ISSUE DATE	04/16/88
(5) 11802	(10) REP: MR WILLENBROCK 938-9700	(14) PRIOR CO EXPIRATION DATE	04/15/89

MISSION (41)UTM-E: 626.1 KM. (42)STACK HEIGHT: 20 FT. (43)EXIT VELOCITY: 48.00 FT/SEC RATIO STK HT / BLDG HT: 1.17
POINT (46)UTM-N: 513.1 KM. (47)HT ABV STRUC: 3 FT. (48)EXIT FLOW: 6300.00 ACFM PLUME RISE: NA FT.
00006 (51)GRND ELEV: 120 FT. (52)STK DIAM: 20 IN. (53)EXIT TEMP: 70 DEGR F EFFECTIVE STACK HEIGHT: 20.00 FT.

CONTAMINANTS	CAS NUMBER	E M I S S I O N S			% CONTROL EFFICIENCY	HRLY ACTUAL LBS/HOUR	A A L D A T A (UG/M3)			MAX CALC AMB LEVEL	REMARKS
		ACTUAL	UNIT	PERMISSIBLE			AAL	TOXIC LVL	SOURCE		
ICULATES	(085) NY075-00-0	(087) .130	(088) 01	(090) .130	(091)	(092) .130					
NE,M,O&P MIXT.	(096) 01330-20-7	(098) .480	(099) 01	(101) .480	(102)	(103) .480	1450	MODERATE	NYS DEC	3	
ELLANEOUS ORG	(107) NY990-00-0	(109) .340	(110) 01	(112) .340	(113)	(114) .340					
HATIC ALCOHOL	(118) NY580-00-0	(120) .040	(121) 01	(123) .040	(124)	(125) .040					

END OF TOXICITY ANALYSIS

N.Y.S. DEPARTMENT OF ENVIRONMENTAL CONSERVATION
NASSAU COUNTY DEPARTMENT OF HEALTH

SEQNC NO: 1-X-0285

RUN DATE: 10/02/89

282400 2476 00007 W I
LOCATION FAC EP

PROCESS, EXHAUST OR VENTILATION SYSTEM UNIT
ACTION DUE NOTICE

OWNER) SERVO CORP OF AMER) 111 NEW SOUTH RD) HICKSVILLE (4) NY) 11802	FACILITY (6) SERVO CORP OF AMER (7) 111 NEW SOUTH RD (8) HICKSVILLE (9) 11802 (10) REP: MR WILLENBROCK 938-9700	(11) CONFIDENTIAL STATUS NON-CONFIDNT (12) APPLICATION STATUS PC/CO EXPIRE DATE OF LAST CHANGE 05/22/89 (13) PRIOR CO ISSUE DATE 04/16/88 (14) PRIOR CO EXPIRATION DATE 04/15/89
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(41)UTH-E: 626.1 KM. (42)STACK HEIGHT: 20 FT. (43)EXIT VELOCITY: 54.00 FT/SEC (44)SIC: 3620 (45)AGENCY-CODE-1: C (COUNTY)
 (46)UTH-N: 513.1 KM. (47)HT ABV STRUC: 4 FT. (48)EXIT FLOW: 3450.00 ACFM (49)CO FEE: \$50.00 (50)AGENCY-CODE-2: C (COUNTY)
 (51)GRND ELEV: 120 FT. (52)STK DIAM: 14 IN. (53)EXIT TEMP: 70 DEGR F (54)CO CONDITIONS: 1

(55)HOURS/DAY: 5.0 (56)DAYS/YEAR: 250 (57)% OP BY SEASON: 25 25 25 25 (58)SOURCE CODE: A1302 GRAPHIC ARTS-ROTOGRA
 (59)BLOG: MAIN (60)FLOOR NAME: 1 (61)RULE 1: 228.00 (62)RULE 2: 212.00

(72)DESCRIPTION 1. SIMPLE SILK-SCREENING JOB
 2. METAL PANELS ARE LETTERED IN SPRAY BOOTH

(73)TYPE: 001 FAN (74)MFG: UNKNOWN (75)ID: 01 (76)DATE INSTALLED: 01/59
 (77)DISPOSAL METHOD: 09 OTHER (78)USEFUL LIFE: 10 YEARS

CONTAMINANTS	CAS NUMBER	ENV RATING	EMISSIONS					% CONTROL EFFICIENCY	HRLY ACTUAL LBS/HOUR	ANNUAL EMISSIONS (LBS/YEAR)		
			ACTUAL	UNIT	HOW DET	PERMISSIBLE				ACTUAL	10*	PERMISSIBLE
ICULATES	(085) NY075-00-0	(086) D	(087) .130	(088) 01	(089) 09	(090) .130	(091)	(092)	.130	(093)162.500	(094) 0	(095)162.500
ANOL	(096) 00067-56-1	(097) D	(098) .240	(099) 01	(100) 09	(101) .240	(102)	(103)	.240	(104)300.000	(105) 0	(106)300.000
UTYL ALCOHOL	(107) 00078-83-1	(108) D	(109) .240	(110) 01	(111) 09	(112) .240	(113)	(114)	.240	(115)300.000	(116) 0	(117)300.000
NE,M,O&P MIXT.	(118) 01330-20-7	(119) D	(120) .210	(121) 01	(122) 09	(123) .210	(124)	(125)	.210	(126)262.500	(127) 0	(128)262.500
R ALIPHATIC EST	(129) NY690-00-0	(130) D	(131) .170	(132) 01	(133) 09	(134) .170	(135)	(136)	.170	(137)212.500	(138) 0	(139)212.500

(151)CONDITION 1. PART 228 COMPLIANCE REQUIRED

PRIOR COMMENTS (16)BY 816CAP (17)DATE 03/16/89
 10:00AM PART 228 COMPLIANCE REQUIRED

(18)CURRENT COMMENTS (19)BY _____ (20)DATE ____/____/____
 1. _____
 2. _____
 3. _____
 4. _____
 5. _____

(27)LAST INSPECTION DATE ____/____/____
 (21)INSPECTION STATUS 4
 (22)DATE OF NEXT ACTION 10/15/90

N.Y.S. DEPARTMENT OF ENVIRONMENTAL CONSERVATION
NASSAU COUNTY DEPARTMENT OF HEALTH

SEQNC NO: 1-X-0286

RUN DATE: 10/02/89

282400 2476 00007 W I
LOCATION FAC EP

T O X I C I T Y A N A L Y S I S

O W N E R (1) SERVO CORP OF AMER (2) 111 NEW SOUTH RD (3) HICKSVILLE (4) NY (5) 11802		F A C I L I T Y (6) SERVO CORP OF AMER (7) 111 NEW SOUTH RD (8) HICKSVILLE (9) 11802 (10) REP: MR WILLENBROCK 938-9700		(11) CONFIDENTIAL STATUS NON-CONFIDENT
				(12) APPLICATION STATUS PC/CO EXPIRE
				DATE OF LAST CHANGE 05/22/89
				(13) PRIOR CO ISSUE DATE 04/16/88
				(14) PRIOR CO EXPIRATION DATE 04/15/89

SSION	(41)UTH-E:	626.1 KM.	(42)STACK HEIGHT:	20 FT.	(43)EXIT VELOCITY:	54.00 FT/SEC	RATIO STK HT / BLDG HT:	1.25
POINT	(46)UTH-N:	513.1 KM.	(47)HT ABV STRUC:	4 FT.	(48)EXIT FLOW:	3450.00 ACFM	PLUME RISE:	NA FT.
00007	(51)GRND ELEV:	120 FT.	(52)STK DIAM:	14 IN.	(53)EXIT TEMP:	70 DEGR F	EFFECTIVE STACK HEIGHT:	20.00 FT.

N O T E - S O U R C E C O D E I N D I C A T E S C A S E S P E C I F I C E X A M I N A T I O N N E C E S S A R Y

TAMINANTS	CAS NUMBER	E M I S S I O N S			% CONTROL EFFICIENCY	HRLY ACTUAL LBS/HOUR	A A L D A T A (UG/M3)			MAX CALC AMB LEVEL	REMARKS
		ACTUAL	UNIT	PERMISSIBLE			AAL	TOXIC LVL	SOURCE		
ICULATES	(085) NY075-00-0	(087) .130	(088) 01	(090) .130	(091)	(092) .130					
ANOL	(096) 00067-56-1	(098) .240	(099) 01	(101) .240	(102)	(103) .240					
UTYL ALCOHOL	(107) 00078-83-1	(109) .240	(110) 01	(112) .240	(113)	(114) .240					
NE,M,O&P MIXT.	(118) 01330-20-7	(120) .210	(121) 01	(123) .210	(124)	(125) .210					
R ALIPHATIC EST	(129) NY690-00-0	(131) .170	(132) 01	(134) .170	(135)	(136) .170	1450	MODERATE	NYS DEC	1	SEE NOTE ABV

E N D O F T O X I C I T Y A N A L Y S I S

N.Y.S. DEPARTMENT OF ENVIRONMENTAL CONSERVATION
NASSAU COUNTY DEPARTMENT OF HEALTH

SEQNC NO: 1-X-0287

RUN DATE: 10/02/89

282400 2476 00008 W I

LOCATION FAC EP

PROCESS, EXHAUST OR VENTILATION SYSTEM UNIT
ACTION DUE NOTICE

OWNER (1) SERVO CORP OF AMER (2) 111 NEW SOUTH RD (3) HICKSVILLE (4) NY (5) 11802	FACILITY (6) SERVO CORP OF AMER (7) 111 NEW SOUTH RD (8) HICKSVILLE (9) 11802 (10) REP: MR WILLENBROCK 938-9700	(11) CONFIDENTIAL STATUS NON-CONFIDENTIAL (12) APPLICATION STATUS PC/CO EXPIRE DATE OF LAST CHANGE 05/22/89 (13) PRIOR CO ISSUE DATE 04/16/88 (14) PRIOR CO EXPIRATION DATE 04/15/89
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(15) UTM-E: 626.1 KM. (16) UTM-N: 513.1 KM. (17) UTM ABV STRUC: 4 FT. (18) EXIT VELOCITY: 70.00 FT/SEC (19) EXIT FLOW: 4500.00 ACFM (20) EXIT TEMP: 160 DEGR F (21) SIC: 3620 (22) AGENCY-CODE-1: C (COUNTY)
 (23) GRND ELEV: 120 FT. (24) STK DIAM: 14 IN. (25) % OP BY SEASON: 25 25 25 25 (26) CO FEE: \$50.00 (27) AGENCY-CODE-2: C (COUNTY)
 (28) HOURS/DAY: 3.0 (29) DAYS/YEAR: 250 (30) FLOOR NAME: 1 (31) SOURCE CODE: A1402 (32) CO CONDITIONS: 1
 (33) BLDG: MAIN (34) BAKING AND DRYING (35) RULE 1: 228.00 (36) RULE 2:

(37) DESCRIPTION 1. MATERIALS PAINTED IN PAINT SPRAY BOOTHS ARE PLACED
 2. IN ELECT HEATED OVEN TO ENHANCE DRYING OF PAINT
 (38) TYPE: 001 FAN (39) MFG: G ARDEN (40) ID: 01 (41) DATE INSTALLED: 01/59
 (42) DISPOSAL METHOD: (43) USEFUL LIFE: 10 YEARS

CONTAMINANTS	CAS NUMBER	ENV RATING	EMISSIONS				% CONTROL EFFICIENCY	HRLY ACTUAL LBS/HOUR	ANNUAL EMISSIONS (LBS/YEAR)		
			ACTUAL	UNIT	HOW DET	PERMISSIBLE			ACTUAL	10X	PERMISSIBLE
L ORGANIC SOLVE	(085) NY998-00-0	(086) D	(087) .200	(088) 01	(089)	(090) .200	(091)	(092) .200	(093) 150.000	(094) 0	(095) 150.000

(44) CONDITION 1. PART 228 COMPLIANCE REQUIRED
 (45)

PRIOR COMMENTS (16) BY 816CAP (17) DATE 03/16/89 10:00AM PART 228 COMPLIANCE REQUIRED	(18) CURRENT COMMENTS (19) BY _____ (20) DATE ____/____/____ 1. _____ 2. _____ 3. _____ 4. _____ 5. _____	(21) LAST INSPECTION DATE ____/____/____ (22) INSPECTION STATUS 4 (23) DATE OF NEXT ACTION 10/15/90
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N.Y.S. DEPARTMENT OF ENVIRONMENTAL CONSERVATION
NASSAU COUNTY DEPARTMENT OF HEALTH

SEQNC NO: 1-R-0130
RUN DATE: 01/08/90

2400 2476 00013 W I

ATION. FAC EP

CERTIFICATE TO OPERATE AN AIR CONTAMINATION SOURCE
PROCESS, EXHAUST OR VENTILATION SYSTEM UNIT
RENEWAL APPLICATION

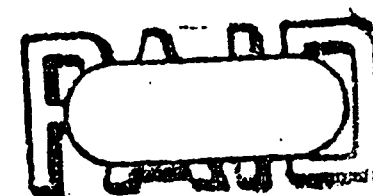
OWNER SERVO CORP OF AMER 111 NEW SOUTH RD HICKSVILLE (4) NY 11802	FACILITY (6) SERVO CORP OF AMER (7) 111 NEW SOUTH RD (8) HICKSVILLE (9) 11802 (10) REP: MR WILLENBROCK 938-9700	(11) CONFIDENTIAL STATUS NON-CONFID (12) APPLICATION STATUS IN COMPLIAN DATE OF LAST CHANGE 05/22/89 PRIOR CO ISSUE DATE 04/16/89 PRIOR CO EXPIRATION DATE 04/15/90
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PAGE 4
CONTINUED FROM PREVIOUS PAGE

(41)UTH-E: 626.1 KM.	(42)STACK HEIGHT: 26 FT.	(43)EXIT VELOCITY: 24.00 FT/SEC	(44)SIC: 3620	(45)AGENCY-CODE-1: C (COUNT
(46)UTH-N: 513.1 KM.	(47)HT ADV STRUC: 4 FT.	(48)EXIT FLOW: 1510.00 ACFM	(49)CO FEE: \$150.00	(50)AGENCY-CODE-2: C (COUNT
(51)GRND ELEV: 135 FT.	(52)STK DIAM: 10X15 IN.	(53)EXIT TEMP: 70 DEGR F	(54)CO CONDITIONS:	
(55)HOURS/DAY:	(56)DAYS/YEAR:	(57)% OP BY SEASON:	(58)SOURCE CODE:	
(59)BLDG:	(60)FLOOR NAME:	(61)RULE 1: 212.00	(62)RULE 2:	

MINANTS	CAS NUMBER	ENV RATING	E M I S S I O N S				% CONTROL EFFICIENCY	HRLY ACTUAL LBS/HOUR	ANNUAL EMISSIONS (LBS/YEAR)		
			ACTUAL	UNIT	HOW DET	PERMISSIBLE			ACTUAL	10x	PERMISSIBLE
HYDROXIDE	(085) 01310-73-2	(086) D	(087)	(088) 94	(089) 06	(090)	(091)	(092)	(093) .060	(094) 0	(095) .0
ACETATE	(096) 00628-63-7	(097) D	(098)	(099) 01	(100) 06	(101)	(102)	(103)	(104) 47.500	(105) 0	(106) 47.5
IC ACID	(107) 07664-93-9	(108) D	(109)	(110) 01	(111) 06	(112)	(113)	(114)	(115) 8.000	(116) 0	(117) 8.0
EN FLUORIDE	(118) 07664-39-3	(119) D	(120)	(121) 01	(122) 06	(123)	(124)	(125)	(126) 24.000	(127) 0	(128) 24.0
LANEUS ORG	(129) NY990-00-0	(130) D	(131)	(132) 94	(133) 06	(134)	(135)	(136)	(137) .500	(138) 0	(139) .5

AL (151)CONDITION 1. AG1 COMPLIANCE
TIONS



#DOUBLE PAYMENT LAST YEAR

(16)BY (17)DATE	(18)CURRENT COMMENTS (19)BY 1. _____ 2. _____ 3. _____ 4. _____ 5. _____	(20)DATE <u>1/1</u> (21)INSPECTION STATUS (22)DATE OF NEXT ACTION (23)ISSUE DATE <u>04/16/90</u> (24)EXPIRATION DATE <u>04/15/91</u> (25)CO FEE <u>\$0</u>
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EP'S SIGNATURE:

DATE:

ISSUING OFFICER'S SIGNATURE:

DATE:

[Handwritten Signature]

[Handwritten Date: 4/16/90]

[Handwritten Signature: Bruce B. Smith, P.E.]

[Handwritten Date: 8/28/90]

N.Y.S. DEPARTMENT OF ENVIRONMENTAL CONSERVATION
NASSAU COUNTY DEPARTMENT OF HEALTH

SEQNC NO: 1-R-0127
RUN DATE: 01/08/90

12400 2476 00013 W 101

ATION FAC EP UNIT

CERTIFICATE TO OPERATE AN AIR CONTAMINATION SOURCE
PROCESS, EXHAUST OR VENTILATION SYSTEM UNIT
RENEWAL APPLICATION

OWNER SERVO CORP OF AMER 111 NEW SOUTH RD HICKSVILLE (4) NY 11802	FACILITY (6) SERVO CORP OF AMER (7) 111 NEW SOUTH RD (8) HICKSVILLE (9) 11802 (10) REP: MR WILLENBROCK 938-9700	(11) CONFIDENTIAL STATUS NON-CONFIDN (12) APPLICATION STATUS IN COMPLIAN DATE OF LAST CHANGE 05/22/89 PRIOR CO ISSUE DATE 04/16/89 PRIOR CO EXPIRATION DATE 04/15/90
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(1)UTH-E: 626.1 KM. (2)STACK HEIGHT: 26 FT. (3)EXIT VELOCITY: 24.00 FT/SEC (4)SIC: 3620 (5)AGENCY-CODE-1: C (COUNT
(6)UTH-N: 513.1 KM. (7)HT ABV STRUC: 4 FT. (8)EXIT FLOW: 1510.00 ACFM (9)CO FEE: \$150.00 (10)AGENCY-CODE-2: C (COUNT
(11)GRND ELEV: 135 FT. (12)STK DIAM: 10X15 IN. (13)EXIT TEMP: 70 DEGR F (14)CO CONDITIONS:

(15)HOURS/DAY: 2.0 (16)DAYS/YEAR: 250 (17)% OP BY SEASON: 25 25 25 25 (18)SOURCE CODE: 16PG LAB HOODS-ELECTRIC

(19)DESCRIPTION 1. HOODED WASH SINK USED FOR LAB PROCESSING OF
(20)DESCRIPTION 2. INFRARED LENS ASSEMBLIES

(21)TYPE: 099 NONE
(22)

MINANTS	CAS NUMBER	E M I S S I O N S				% CONTROL EFFICIENCY	HRLY ACTUAL LBS/HOUR	ANNUAL EMISSIONS (LBS/YEAR)	
		ACTUAL	UNIT	HOW DET				ACTUAL	10 ^x
N HYDROXIDE	(1085) 01310-73-2	(1087)	94	(1089) 06	(1091)	(1092)	(1093)	.060	(1094) 0
L ACETATE	(1096) 00628-63-7	(1098)	.043	(1099) 01	(1100) 06	(1102)	(1103)	.043	(1104) 21.500 (1105) 0
RIC ACID	(1107) 07664-93-9	(1109)	.016	(1110) 01	(1111) 06	(1113)	(1114)	.016	(1115) 8.000 (1116) 0
GEN FLUORIDE	(1118) 07664-39-3	(1120)	.048	(1121) 01	(1122) 06	(1124)	(1125)	.048	(1126) 24.000 (1127) 0

N.Y.S. DEPARTMENT OF ENVIRONMENTAL CONSERVATION
NASSAU COUNTY DEPARTMENT OF HEALTH

SEQNC NO: 1-R-0128
RUN DATE: 01/08/90

2400 2476 00013 W 102

ATION FAC EP UNIT

CERTIFICATE TO OPERATE AN AIR CONTAMINATION SOURCE
PROCESS, EXHAUST OR VENTILATION SYSTEM UNIT
RENEWAL APPLICATION

O W N E R SERVO CORP OF AMER 111 NEW SOUTH RD HICKSVILLE (4) NY 11802	F A C I L I T Y (6) SERVO CORP OF AMER (7) 111 NEW SOUTH RD (8) HICKSVILLE (9) 11802 (10) REP: MR WILLENBROCK 938-9700	(11) CONFIDENTIAL STATUS NON-CONFIDNT (12) APPLICATION STATUS IN COMPLIANC DATE OF LAST CHANGE 05/22/89 PRIOR CO ISSUE DATE 04/16/89 PRIOR CO EXPIRATION DATE 04/15/90
--	---	--

P A G E 2
C O N T I N U E D F R O M P R E V I O U S P A G E

ION (41)UTH-E: 626.1 KM. (42)STACK HEIGHT: 26 FT. (43)EXIT VELOCITY: 24.00 FT/SEC (44)SIC: 3620 (45)AGENCY-CODE-1: C (COUNTY
INT (46)UTH-N: 513.1 KM. (47)HT ABV STRUC: 4 FT. (48)EXIT FLOW: 1510.00 ACFM (49)CO FEE: \$150.00 (50)AGENCY-CODE-2: C (COUNTY
Q13 (51)GRND ELEV: 135 FT. (52)STK DIAM: 10X15 IN. (53)EXIT TEMP: 70 DEGR F (54)CO CONDITIONS:
.....
I02 (55)HOURS/DAY: 2.0 (56)DAYS/YEAR: 250 (57)% OP BY SEASON: 25 25 25 25 (58)SOURCE CODE: 1206 WASHING AND CLEANING
.....
SS/UNIT (72)DESCRIPTION 1. HOODED WASH SINK #2 IN IREO LAB
IPTION
.....
OL (73)TYPE: 099 NONE
MENT
.....

MINANTS	CAS NUMBER	E M I S S I O N S				% CONTROL EFFICIENCY	HRLY ACTUAL LBS/HOUR	ANNUAL EMISSIONS (LBS/YEAR)	
		ACTUAL	UNIT	HOW DET				ACTUAL	10*
LLANEOUS ORG	(085) NY990-00-0	(087) .001	(088) 94	(089) 06	(091)	(092) .001	(093) .500	(094) 0	

C O N T I N U E D O N N E X T P A G E

N.Y.S. DEPARTMENT OF ENVIRONMENTAL CONSERVATION
NASSAU COUNTY DEPARTMENT OF HEALTH

SEQNC NO: 1-R-0129
RUN DATE: 01/08/90

12400 2476 00013 W 103

CATION FAC EP UNIT

CERTIFICATE TO OPERATE AN AIR CONTAMINATION SOURCE
PROCESS, EXHAUST OR VENTILATION SYSTEM UNIT
RENEWAL APPLICATION

OWNER SERVO CORP OF AMER 111 NEW SOUTH RD HICKSVILLE (4) NY 11802	FACILITY (6) SERVO CORP OF AMER (7) 111 NEW SOUTH RD (8) HICKSVILLE (9) 11802 (10) REP: MR WILLENBROCK 938-9700	(11) CONFIDENTIAL STATUS NON-CONFIDN (12) APPLICATION STATUS IN COMPLIAN DATE OF LAST CHANGE 05/22/89 PRIOR CO ISSUE DATE 04/16/89 PRIOR CO EXPIRATION DATE 04/15/90
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PAGE 3
CONTINUED FROM PREVIOUS PAGE

(141)UTH-E: 626.1 KM. (142)STACK HEIGHT: 26 FT. (143)EXIT VELOCITY: 24.00 FT/SEC (144)SIC: 3620 (145)AGENCY-CODE-1: C (COUNT
(146)UTH-N: 513.1 KM. (147)HT ABV STRUC: 4 FT. (148)EXIT FLOW: 1510.00 ACFM (149)CO FEE: \$150.00 (150)AGENCY-CODE-2: C (COUNT
(151)GRND ELEV: 135 FT. (152)STK DIAM: 10X15 IN. (153)EXIT TEMP: 70 DEGR F (154)CO CONDITIONS:
(155)HOURS/DAY: 8.0 (156)DAYS/YEAR: 250 (157)% OP BY SEASON: 25 25 25 25 (158)SOURCE CODE: 16XI VAC PUMP-INSTRUMENT

(72)DESCRIPTION 1. EXHAUST FOR FOUR VACUUM CHAMBERS USED FOR PROCESS-
2. ING INFRARED LENS ASSEMBLIES

(73)TYPE: 099 NONE

MINANTS	CAS NUMBER	E M I S S I O N S				% CONTROL EFFICIENCY	HRLY ACTUAL LBS/HOUR	ANNUAL EMISSIONS (LBS/YEAR)	
		ACTUAL	UNIT	NON DET	ACTUAL			10 ^x	
/L ACETATE	(1085) 00628-63-7	(1087) .013	(1088) 01	(1089) 06	(1091)	(1092) .013	(1093) 26.000	(1094) 0	

CONTINUED ON NEXT PAGE

N.Y.S. DEPARTMENT OF ENVIRONMENTAL CONSERVATION
NASSAU COUNTY DEPARTMENT OF HEALTH

SEQNC NO: 1-R-3126
RUN DATE: 01/08/90

1400 2476 00004 W I

TION FAC EP

CERTIFICATE TO OPERATE AN AIR CONTAMINATION SOURCE
PROCESS, EXHAUST OR VENTILATION SYSTEM UNIT
RENEWAL APPLICATION

OWNER SERVO CORP OF AMER 111 NEW SOUTH RD HICKSVILLE (4) NY 11802	FACILITY (6) SERVO CORP OF AMER (7) 111 NEW SOUTH RD (8) HICKSVILLE (9) 11802 (10) REP: MR WILLENBROCK 938-9700	(11) CONFIDENTIAL STATUS NON-CONFIDENT (12) APPLICATION STATUS IN COMPLIANCE DATE OF LAST CHANGE 05/22/89 PRIOR CO ISSUE DATE 04/16/89 PRIOR CO EXPIRATION DATE 04/15/90
--	--	--

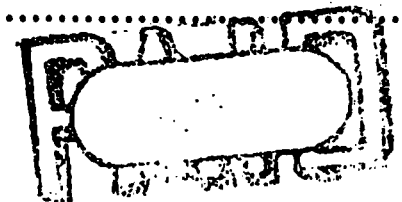
(41)UTH-E: 626.1 KM. (46)UTH-N: 513.1 KM. (51)GRND ELEV: 120 FT.	(42)STACK HEIGHT: 17 FT. (47)INT ABV STRUC: 1 FT. (52)STK DIAM: 22 IN.	(43)EXIT VELOCITY: 24.90 FT/SEC (48)EXIT FLOW: 3940.00 ACFM (53)EXIT TEMP: 70 DEGR F	(44)SIC: 3620 (49)CO FEE: \$100.00 (54)CO CONDITIONS: 1	(45)AGENCY-CODE-1: C (COUNTY) (50)AGENCY-CODE-2: C (COUNTY)
(55)HOURS/DAY: 8.0 (59)BLDG: MAIN	(56)DAYS/YEAR: 260 (60)FLOOR NAME: 1	(57)% OP BY SEASON: 25 25 25 25 (58)SOURCE CODE: A1203	(61)RULE 1: 226.00 (62)RULE 2:	DEGREASING AND CLEAN

- S/UNIT PTION (72)DESCRIPTION
1. METALLIC PORTION TO BE SOLDERED
 2. IS CLEANED INSIDE THIS DEGREASER TANK
 3. MEDIUM USED IS FREON THC
 4. EMISSION FROM TANK IS MANIFOLDED BY
 5. MEANS OF HOOD WITH ROOM AIR

L ENT (73)TYPE: 001 FAN (74)MFG: ILG VENT CO MODEL LCRF182 (77)DISPOSAL METHOD: 09 OTHER	(75)ID: 01 (76)DATE INSTALLED: 01/66 (78)USEFUL LIFE: 10 YEARS
--	--

INANTS	CAS NUMBER	ENV RATING	E M I S S I O N S				% CONTROL EFFICIENCY	HRLY ACTUAL LBS/HOUR	ANNUAL EMISSIONS (LBS/YEAR)		
			ACTUAL	UNIT	HOM DET	PERMISSIBLE			ACTUAL	10*	PERMISSIBLE
2	(085) 00075-71-8	(086) D	(087) 4.200	(088) 01	(089) 06	(090) 4.200	(091)	(092) 4.200	(093) 8736	(094) 0	(095) 8736

L IONS (151)CONDITION 1. AAL COMPLIANCE



OR COMMENTS (16)BY 816CAP 30AM OPER SATIS	(17)DATE 02/15/85 (18)CURRENT COMMENTS (19)BY 1. _____ 2. _____ 3. _____ 4. _____ 5. _____	(20)DATE / / (27)LAST INSPECTION DATE / / (21)INSPECTION STATUS (22)DATE OF NEXT ACTION / / (23)ISSUE DATE / / (24)EXPIRATION DATE / / (25)CO FEE \$100
--	--	---

P'S SIGNATURE: *Willenbrock* DATE: *2/6/90* ISSUING OFFICER'S SIGNATURE: *Bruce B Smith, P.E.* DATE: *8/22/90* *8/28/90*

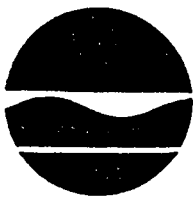
REFERENCE NO. 20

WESTON

PROJECT NOTE

TO: Project File - Servo Corporation DATE: September 1996
FROM: Tonya Balla W.O. NO.: 04200-022-081-0129-05
SUBJECT: Sensitive Environments

Based on information provided by the New York State Department of Environmental Conservation-Wildlife Resources Center, there are 13 State threatened or endangered species within a four mile radius of the site. Three of the thirteen species are also listed on the federal threatened or endangered species list. The nearest threatened or endangered species to the site is located approximately 1 mile west of the site.



Michael D. Zagata
Commissioner

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Wildlife Resources Center
700 Troy-Schenectady Road
Latham, NY 12110-2400

(518) 783-3932

August 23, 1996



John Major
Director

Michelle L. Hunter
Roy F. Weston
Sutton Park, Suite 205
465 Columbus Avenue
Valhalla, NY 10595-1336

Dear Ms. Hunter:

We have reviewed the New York Heritage Program files with respect to your recent request for biological information concerning the USEPA Hazardous Waste Investigation, the SERVO CORP. OF AMERICA SITE, as indicated on your enclosed map, located in the Town of Hicksville, Nassau County, New York State.

Enclosed is a computer printout covering the area you requested to be reviewed by our staff. The information contained in this report is considered sensitive and may not be released to the public without permission from the New York Natural Heritage Program.

Our files are continually growing as new habitats and occurrences of rare species and communities are discovered. In most cases, site-specific or comprehensive surveys for plant and animal occurrences have not been conducted. For these reasons, we can only provide data which have been assembled from our files. We cannot provide a definitive statement on the presence or absence of species, habitats or natural communities. This information should not be substituted for on-site surveys that may be required for environmental assessment.

This response applies only to known occurrences of rare animals, plants and natural communities and/or significant wildlife habitats. You should contact our regional office, Division of Regulatory Affairs, at the address enclosed for information regarding any regulated areas or permits that may be required (e.g., regulated wetlands) under State Law.

If this proposed project is still active one year from now we recommend that you contact us again so that we can update this response.

Sincerely,

Nancy Davis Ricci

Nancy Davis-Ricci
Information Services
New York Natural Heritage Program

Encs.

cc: Reg. 1, Wildlife Mgr.
Reg. 1, Fisheries Mgr.

BIOLOGICAL AND CONSERVATION DATA SYSTEM - ELEMENT OCCURRENCE REPORT, 19 AUG 1996
Prepared by N.Y.S.D.E.C. Natural Heritage Program, Latham New York

(This report contains sensitive information which should be treated in a sensitive manner. Refer to the users guide for explanation of codes and ranks.)

* COUNTY & TOWN	USGS TOPO MAP/ LAT. & LONG.	PREC- ISION	LAST SEEN	EO RANK	SCIENTIFIC AND COMMON NAME	ELEMENT TYPE	NY STATUS	US STATUS	HERITAGE RANKS	OFFICE USE	OFFICE USE
* NASSAU											
CITY OF GLEN COVE	HICKSVILLE 405135 733715	G		X	PLATANThERA CILIARIS ORANGE FRINGED ORCHIS	VASCULAR PLANT 50	T		G5 S1	-16.08/18.15 9.2	4007375 13
HEMPSTEAD	AMITYVILLE 404422 732952	M	1928	X	ASTER CONCOLOR SILVERY ASTER	VASCULAR PLANT 50	E		G47 S1	1.09/-3.68 1.5	4007364 33
HEMPSTEAD	AMITYVILLE 404317 732946	M	1934	X	PLATANThERA CILIARIS ORANGE FRINGED ORCHIS	VASCULAR PLANT 50	T		G5 S1	1.37/-6.96 2.7	4007364 9
HEMPSTEAD	AMITYVILLE 404322 732940	M	1918	X	SCLERIA PAUCIFLORA VAR CAROLINIANA FEWFLOWER NUTRUSH	VASCULAR PLANT 50	T		G5T4T5 S1	1.55/-6.71 2.4	4007364 34
HEMPSTEAD	FREEPORT 404314 733130	S	1918	X	AGALINIS ACUTA SANDPLAIN GERARDIA	VASCULAR PLANT 100	E	LE	G1 S1	-2.71/-7.11 2.9	4007365 17
HEMPSTEAD	FREEPORT 404235 733407	M	1946	H	ASTER SOLIDAGINEUS FLAX-LEAF WHITETOP	VASCULAR PLANT	U		G5 S2		4007365 49
HEMPSTEAD	FREEPORT 404316 733110	M	1919	X	DIGITARIA FILIFORMIS SLENDER CRABGRASS	VASCULAR PLANT	R		G5 S2		4007365 30
HEMPSTEAD	FREEPORT 404301 733121	M	1919	X	HELIANTHEMUM DUMOSUM BUSHY ROCKROSE	VASCULAR PLANT 50	T	C2	G3 S2	-2.34/-7.77 3.1	4007365 13
HEMPSTEAD OYSTER BAY	FREEPORT 404425 733112	M	1921	H	SCLERIA PAUCIFLORA VAR CAROLINIANA FEWFLOWER NUTRUSH	VASCULAR PLANT 50	T		G5T4T5 S1	-2.02/-3.63 1.5	4007365 46
NORTH HEMPSTEAD	HICKSVILLE 404526 733314	M	1916	X	AGALINIS ACUTA SANDPLAIN GERARDIA	VASCULAR PLANT 100	E	LE	G1 S1	-6.74/-0.45 2.5	4007375 4
NORTH HEMPSTEAD	HICKSVILLE 404526 733314	M	1907	X	ASTER SOLIDAGINEUS FLAX-LEAF WHITETOP	VASCULAR PLANT	U		G5 S2		4007375 4

BIOLOGICAL AND CONSERVATION DATA SYSTEM - ELEMENT OCCURRENCE REPORT, 19 AUG 1996

Prepared by N.Y.S.D.E.C. Natural Heritage Program, Latham New York

(This report contains sensitive information which should be treated in a sensitive manner. Refer to the users guide for explanation of codes and ranks.)

* COUNTY & TOWN	USGS TOPO MAP/ LAT. & LONG.	PREC- ISION	LAST SEEN	EO RANK	SCIENTIFIC AND COMMON NAME	ELEMENT TYPE	NY STATUS	US STATUS	HERITAGE RANKS	OFFICE USE	OFFICE USE
OYSTER BAY	AMITYVILLE 404303 732849	M	1936	X	LINUM MEDIUM VAR TEXANUM SOUTHERN YELLOW FLAX	VASCULAR PLANT	50	T	G5T5 S2	3.53/-7.66 3.7	4007364 2
OYSTER BAY	AMITYVILLE 404317 732755	M	1936	X	POLYGALA INCARNATA PINK MILKWORT	VASCULAR PLANT		U	G5 SX		4007364 37
OYSTER BAY	AMITYVILLE 404321 732841	M	1936	X	SCLERIA PAUCIFLORA VAR CAROLINIANA FEWFLOWER NUTRUSH	VASCULAR PLANT	50	T	G5T4T5 S1	3.94/-6.76 3.0	4007364 13
OYSTER BAY	AMITYVILLE 404433 732650	M	1899	H	SCUTELLARIA INTEGRIFOLIA HYSSOP-SKULLCAP	VASCULAR PLANT		U	G5 S1		4007364 40
OYSTER BAY	FREEPORT 404422 733127	M	1951	X	AGALINIS ACUTA SANDPLAIN GERARDIA	VASCULAR PLANT	100	E	LE G1 S1	-2.60/-3.68 1.7	4007365 14
OYSTER BAY	HICKSVILLE 404740 733248	S	1984	D	AMBYSTOMA TIGRINUM TIGER SALAMANDER	AMPHIBIAN	50	E	G5 S3	-5.71/6.80 ESU 8.2	4007375 7
OYSTER BAY	HICKSVILLE 404731 733243	S	1987	BC	ASCLEPIAS VIRIDIFLORA GREEN MILKWEED	VASCULAR PLANT		R	G5 S2		4007375 1
OYSTER BAY	HICKSVILLE 404732 733311	G	1897	X	HOUSTONIA PURPUREA VAR CALYCOSA PURPLE BLUETS	VASCULAR PLANT		U	G5T5 SH		4007375 10
OYSTER BAY	HICKSVILLE 404554 733121	M	1896	X	PLATANThERA CILIARIS ORANGE FRINGED ORCHIS	VASCULAR PLANT	50	T	G5 S1	-2.36/0.96 1.0	4007375 14
OYSTER BAY	HUNTINGTON 404653 732956	M	1907	X	HELIANTHEMUM DUMOSUM BUSHY ROCKROSE	VASCULAR PLANT	50	T	C2 G3 S2	0.93/3.93 1.5	4007374 2

SIGNIFICANT HABITATS

DATE : 08/22/96

REPORT ID#	NAME OF AREA	TYPE OF AREA	COUNTY	TOWN OR CITY	QUADRANGLE	LATITUDE (DEG MIN SEC)	LONGITUDE (DEG MIN SEC)
SP 30-031	Hempstead Plains	Rare/Unusual Plant Habitat	Nassau	Hempstead	Freeport	40 43 40	73 35 14
SW 30-514	Cove Road	Tiger Salamander Habitat	Nassau	Oyster Bay	Huntington	40 51 30	73 29 36

FORM B: SENSITIVE ENVIRONMENTS DATA REQUEST

Site Name: SERVO CORPORATION OF AMERICA

Work Order No.: 04200-022-081-0129-02

Task Manager: GOPAKUMAR NAIR **Date:** 5/15/96

Site Location (city/town, county, state): 111 NEW SOUTH ROAD, HICKSVILLE,

Latitude: 40° 45' 35" N

NASSAU COUNTY, NY 11802

Longitude: 73° 30' 20W

Name of topo quad on which site is located: HICKSVILLE, NY

Names of all USGS quads containing 4-mile radius and 15-mile surface water pathway:

HICKSVILLE, NY

HUNTINGTON, NY

FREEPORT, NY

AMITYVILLE, NY

List all water bodies that make up the 15-mile surface water pathway:

Also attach a small 4-mile radius/15-mile surface water pathway map to this form (Use the wetland atlas for NJ).

FORWARD THIS FORM TO RICH SETTINO WHEN COMPLETED.



FEDERAL STATUS (plants and animals): The categories of federal status are defined by the United States Department of the Interior as part of the 1974 Endangered Species Act (see Code of Federal Regulations 50 CFR 17). The species listed under this law are enumerated in the Federal Register vol. 50, no. 188 pp. 39526 - 39527.

(blank) = No Federal Endangered Species Act status.

LE = The taxon is formally listed as endangered.

LT = The taxon is formally listed as threatened.

LELT = The taxon is formally listed as endangered in part of its range and threatened in other parts.

PE = The taxon is proposed as endangered.

PT = The taxon is proposed as threatened.

C1 = Candidate, category 1 - There is sufficient information to list the taxon as endangered or threatened.

C2 = Candidate, category 2 - The taxon may be appropriate for listing but more data are needed.

3A = The taxon considered extinct by the U. S. Fish and Wildlife Service (USFWS).

3B = The taxon is no longer considered taxonomically distinct by the USFWS and thus is not appropriate for listing.

3C = The taxon has been shown to be more abundant, widespread, or better protected than previously thought and therefore not in need of official listing.

* = The taxon is possibly extinct.

** = The taxon is thought to be extinct in the wild but extant in cultivation.

Additional codes:

(C2NL) = Heritage code indicating that the taxon is a candidate in some areas, not listed in other areas.

(E/SA) = Heritage code indicating that the taxon is endangered because of similarity of appearance to other endangered species or subspecies.

FEDERAL STATUS (ecological communities): At this time there are no federal status categories defined for ecological communities.

GLOBAL AND STATE RANKS (animals, plants, ecological communities and others): Each element has a global and state rank as determined by the NY Natural Heritage Program. These ranks carry no legal weight. The global rank reflects the rarity of the element throughout the world and the state rank reflects the rarity within New York State. Intraspecific taxa are also assigned a taxon rank to reflect the intraspecific taxon's rank throughout the world.

GLOBAL RANK:

G1 = Critically imperiled globally because of extreme rarity (5 or fewer occurrences), or very few remaining acres, or miles of stream) or especially vulnerable to extinction because of some factor of its biology.

G2 = Imperiled globally because of rarity (6 - 20 occurrences, or few remaining acres, or miles of stream) or very vulnerable to extinction throughout its range because of other factors.

G3 = Either rare and local throughout its range (21 to 100 occurrences), or found locally (even abundantly at some of its locations) in a restricted range (e.g. a physiographic region), or vulnerable to extinction throughout its range because of other factors.

G4 = Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.

G5 = Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.

GH = Historically known, with the expectation that it might be rediscovered.

GX = Species believed to be extinct.

GU = Status unknown.

STATE RANK:

S1 = Typically 5 or fewer occurrences, very few remaining individuals, acres, or miles of stream, or some factor of its biology making it especially vulnerable in New York State.

S2 = Typically 6 to 20 occurrences, few remaining individuals, acres, or miles of stream, or factors demonstrably making it very vulnerable in New York State.

S3 = Typically 21 to 100 occurrences, limited acreage, or miles of stream in New York State.

S4 = Apparently secure in New York State.

S5 = Demonstrably secure in New York State.

SH = Historically known from New York State, but not seen in the past 15 years.

SX = Apparently extirpated from New York State.

SA = Accidental or casual in the state.

SE = Exotic, not native to New York State.

SP = Element potentially occurs in the state but there are no occurrences reported.

SR = Reported in the state but without persuasive documentation.

SU = Status unknown.

TAXON (T) RANK: The T-ranks (T1 - T5) are defined the same way the Global ranks (G1 - G5) are but the T-rank only refers to the rarity of the subspecific taxon of the species as a whole.

T1 through T5 = See Global Rank definitions above.

Q = Indicates a question exists whether or not the taxon is a good taxonomic entity.

? = Indicates a question exists about the rank.

OFFICE USE: Information for use by the Natural Heritage Program.

SIGNIFICANT HABITAT DATABASE REPORTS (Use of this database is slowly being discontinued as the data is integrated into Heritage databases)

REPORT ID: Significant habitat file code.

NAME OF AREA: Site name where the significant habitat is located.

TYPE OF AREA: Type of significant habitat.

COUNTY/TOWN OR CITY: County and town where the significant habitat is located.

QUADRANGLE: Name of the USGS 7.5 minute topographic map where the significant habitat is located.

LATITUDE: Latitude coordinate (degrees, minutes, seconds) for the location of the significant habitat.

LONGITUDE: Longitude coordinate for the location of the significant habitat.

REFERENCE NO. 21

FROST ASSOCIATES

P.O. Box 495, Essex, Connecticut 06426
(860) 767-7644 FAX (860) 767-1971

June 10, 1996

To: Roy F. Weston Inc
4th Floor Raritan Plaza
Edison, New Jersey 08837-3616

Attn: Jan Holderness

Fr: Frost Associates
P.O. Box 495
Essex, Conn 06426

Tel: (203) 767-1254
Fax: (203) 767-7069

Sub: Servo Corp of America
Hicksville, NY

CERCLIS: NYD002418911

Job: 04200-022-081-0129-02

Site Longitude: 73-30-20 73.505547
Site Latitude : 40-45-35 40.759720

The CENTRACTS report below identifies the population, households, and private water wells of each Block Group that lies within, or partially within, the 4, 3, 2, 1, .5, and .25, mile "rings" of the latitude and longitude coordinates above. CENTRACTS may have up to ten radii of any length. 1000 block groups, and 15000 block group sides.

CENTRACTS uses the 1990 Block Group population and Block Group house count data found in the Census Bureau's 1990 STF-1A files. The sources of water supply data are from the Bureau's 1990 STF-3A files. The boundary line coordinates of the Block Groups were extracted from the Census Bureau's 1990 TIGER/Line Files.

CENTRACTS reports are created with programs written by Frost Associates, P.O. Box 495, Essex, Conn. The code was written using Microsoft's Quick-Basic Ver. 4.5.

Latitude and Longitude coordinates identifying a site are entered in degrees and decimal degrees. One or more county files holding Block Group boundary lines are selected for use by CENTRACTS by determining whether the site coordinates fall within the minimum and maximum Lat\Lon coordinates of each county in the state.

Each Block Group line segment has Lat\Lon coordinates representing the "From" and "To" ends of that line. All coordinates from the selected county files are read and converted from degrees, decimal degrees to X\Y miles from the site location. Each line segment is then examined whether it lies within or partially within the maximum ring from the site.

The unique Block Group ID numbers of each line segment that lie within the maximum ring are retained. All Block Group boundary lines matching the Block Group numbers are then extracted from the respective county files to obtain all sides of the included Block Groups. Boundary records are then sorted in adjacent side order to determine the shape and area of each Block Group polygon.

A method to solve for the area of a polygon is to take one-half the sum of the products obtained by multiplying each X-coordinate by the difference between the adjacent Y-coordinates. For a polygon with coordinates at adjacent angles A, B, C, D, and E. The formula can be expressed:

$$\text{Area} = 1/2 \{ X_a(Y_e - Y_b) + X_b(Y_a - Y_c) + X_c(Y_b - Y_d) + X_d(Y_c - Y_e) + X_e(Y_d - Y_a) \}$$

For each ring, the selected Block Groups will be inside, outside, or intersected by the ring. When a polygon is intersected, the partial Block Group area within that ring is calculated using the method described below.

When a ring intersects a Block Group, the intersect points are solved and plotted at the points where the ring enters and exits the shape. The chord line, a line within the circle connecting the intersect points is determined. This chord line is used to calculate the segment area, the half moon shape between the chord line and the ring, and the sub-polygon created by the chord line and the Block Group boundaries that lie outside the ring.

The segment area is subtracted from the sub-polygon area to determine the area of the sub-polygon outside the ring. The area outside the ring is then subtracted from the area of the entire polygon to arrive at the inside area. This inside area is then divided by the tract's total area to determine the percentage of area within the ring. This process is repeated for each block group that is intersected by one of the rings. The total area, partial area, and percentage of partial area of those block groups within, or partially within a ring, are held in memory for the report.

On occasion, the algorithm described above is unable to determine the area of the partial area. Within the report program is a "Paint" routine which allows an enclosed shape to be highlighted. Another routine calculates the percentage of highlighted screen pixels to the pixels within the polygon. A manual entry is allowed. Both the "paint" method and manual entry method over ride the calculated method.

CENTRACTS lists, starting on page 4, all Block Groups in State, County, Census Tract, and Block Group ID order that lie within, or partially within, the maximum ring. Each Block Group is identified by a City or Town name and by the Block Group's State, County, Tract and Block Group ID number. Following is the Block Group's 1990 population and house count extracted from the Census Bureau's 1990 STF-1A files.

The next four columns display water source data from the 1990 STF-3A files. The first column is "Units with Public system or private company source of water", followed by "Units with individual well, Drilled, source of water"; "Units with individual well, Dug, source of water" and "Units with Other source of water".

For each ring, CENTRACTS then shows the Block Groups that are within that ring, the Block Group's total area in square miles, the partial area of the Block Group within that ring, and the partial percentage within the ring. The areas of the included Block Group and the partial areas are then totaled.

The last section tallies the demographic data within each ring. The percentage of area for each Block Group is multiplied times the census data for that Block Group and totaled for all Block Group's within the ring. Ring totals are then determined by subtracting the three mile data from the four mile, the two mile from the three mile, one from the two, etc... Population on private wells is calculated using the formula: $((\text{Drilled} + \text{Dug Wells}) / \text{Households}) * \text{Population}$

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No.	City	Block Group ID	Blk Grp People	House Holds	Public Water	Drilled Wells	Dug Wells	Other
1	North Hempstead	36059 3039	1 1328	389	423	0	0	0
2	North Hempstead	36059 3039	2 669	207	202	0	0	0
3	North Hempstead	36059 3041	1 1116	347	329	0	0	0
4	North Hempstead	36059 3041	2 837	259	261	0	0	0
5	North Hempstead	36059 3041	3 1230	526	542	0	0	0
6	Hempstead	36059 4076	1 601	195	197	0	0	0
7	Hempstead	36059 4076	2 564	170	159	0	0	0
8	Hempstead	36059 4076	3 556	180	168	0	0	0
9	Hempstead	36059 4076	4 949	324	301	0	0	0
10	Hempstead	36059 4076	5 492	162	180	0	0	0
11	Hempstead	36059 4076	6 942	323	346	0	0	0
12	Hempstead	36059 4076	7 699	233	228	0	4	0
13	Hempstead	36059 4076	8 696	223	227	0	0	0
14	Hempstead	36059 4077	1 1212	424	431	0	0	0
15	Hempstead	36059 4077	2 1192	396	392	0	0	0
16	Hempstead	36059 4077	3 1219	404	401	0	0	0
17	Hempstead	36059 4077	4 955	320	334	0	0	0
18	Hempstead	36059 4081	2 1376	481	470	0	0	0
19	Hempstead	36059 4082	1 920	282	255	0	0	0
20	Hempstead	36059 4082	2 883	274	286	0	0	0
21	Hempstead	36059 4082	3 787	260	267	0	0	0
22	Hempstead	36059 4082	4 1028	333	366	0	0	0
23	Hempstead	36059 4082	5 860	290	287	0	0	0
24	Hempstead	36059 4082	6 1030	316	286	0	0	0
25	Hempstead	36059 4082	7 934	295	303	0	0	0
26	Hempstead	36059 4083	1 1152	356	365	0	0	0
27	Hempstead	36059 4083	2 768	247	245	0	0	0
28	Hempstead	36059 4083	3 740	234	225	0	0	0
29	Hempstead	36059 4083	4 519	168	167	0	0	0
30	Hempstead	36059 4083	5 1011	324	349	0	0	0
31	Hempstead	36059 4083	6 945	306	301	0	0	0
32	Hempstead	36059 4083	7 1150	388	380	0	0	0
33	Hempstead	36059 4083	8 842	273	264	0	0	0
34	Hempstead	36059 4085	1 542	186	180	0	0	0
35	Hempstead	36059 4086	1 677	219	220	0	0	0
36	Hempstead	36059 4086	2 681	204	193	0	0	5
37	Hempstead	36059 4086	3 680	221	223	0	0	0
38	Hempstead	36059 4086	4 897	285	292	0	0	0
39	Hempstead	36059 4086	5 924	359	354	0	0	0
40	Hempstead	36059 4086	6 682	218	219	0	0	0
41	Hempstead	36059 4087	1 765	247	254	0	0	0
42	Hempstead	36059 4087	2 827	248	250	0	0	0
43	Hempstead	36059 4087	3 792	253	243	0	0	0
44	Hempstead	36059 4087	4 856	265	270	0	0	0
45	Hempstead	36059 4087	5 977	304	302	0	0	0
46	Hempstead	36059 4087	6 740	237	235	0	0	0
47	Hempstead	36059 4088	1 655	224	229	0	0	9
48	Hempstead	36059 4088	2 948	335	319	0	0	0
49	Hempstead	36059 4088	3 948	295	289	0	0	0
50	Hempstead	36059 4088	4 999	309	322	0	7	0
51	Hempstead	36059 4088	5 1022	319	319	0	0	7
52	Hempstead	36059 4088	6 893	276	266	0	0	0
53	Hempstead	36059 4088	7 862	269	250	0	8	0
54	Hempstead	36059 4088	8 673	204	206	0	0	0
55	Hempstead	36059 4089	1 1099	366	367	0	0	0

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56	Hempstead	36059 4089	2	1173	398	396	0	0	0
57	Hempstead	36059 4089	3	767	242	224	0	0	0
58	Hempstead	36059 4089	4	932	286	264	0	0	13
59	Hempstead	36059 4089	5	751	218	234	0	0	0
60	Hempstead	36059 4089	6	1186	410	415	0	0	7
61	Hempstead	36059 4090	1	446	150	138	0	0	0
62	Hempstead	36059 4090	2	484	154	144	0	0	0
63	Hempstead	36059 4090	3	1124	354	340	0	4	0
64	Hempstead	36059 4090	4	1240	377	385	0	9	0
65	Hempstead	36059 4090	5	1264	364	391	0	0	0
66	Hempstead	36059 4090	6	665	207	186	0	0	0
67	Hempstead	36059 4090	7	766	234	243	0	0	0
68	Hempstead	36059 4091	1	1145	354	339	0	0	6
69	Hempstead	36059 4091	2	841	256	242	0	0	0
70	Hempstead	36059 4091	3	1263	386	397	0	0	0
71	Hempstead	36059 4091	4	1012	305	309	0	0	0
72	Hempstead	36059 4091	5	691	216	233	0	0	0
73	Hempstead	36059 4091	6	769	237	228	0	0	0
74	Hempstead	36059 4092	1	848	266	281	0	7	0
75	Hempstead	36059 4092	2	1110	364	355	0	0	5
76	Hempstead	36059 4092	3	1051	321	297	0	0	0
77	Hempstead	36059 4092	4	771	237	220	0	0	0
78	Hempstead	36059 4092	5	602	199	194	5	0	0
79	Hempstead	36059 4092	6	826	263	276	0	0	0
80	Hempstead	36059 4092	7	1117	350	360	0	0	0
81	Hempstead	36059 4093	1	690	219	220	0	0	0
82	Hempstead	36059 4093	2	494	163	164	0	0	0
83	Hempstead	36059 4093	3	731	245	260	0	0	0
84	Hempstead	36059 4093	4	476	153	149	0	0	0
85	Hempstead	36059 4093	5	1019	322	312	0	0	0
86	Hempstead	36059 4093	6	1209	371	368	0	0	0
87	Hempstead	36059 4094	1	748	255	250	0	0	0
88	Hempstead	36059 4094	2	876	284	294	0	0	0
89	Hempstead	36059 4094	3	709	250	248	0	0	0
90	Hempstead	36059 4094	4	615	210	216	0	0	0
91	Hempstead	36059 4094	5	753	263	258	0	0	0
92	Hempstead	36059 4094	6	518	173	169	0	0	0
93	Hempstead	36059 4095	1	549	174	186	0	0	0
94	Hempstead	36059 4095	2	813	272	255	0	0	0
95	Hempstead	36059 4095	3	477	147	148	0	0	0
96	Hempstead	36059 4095	4	681	222	200	0	0	0
97	Hempstead	36059 4095	5	1487	460	481	0	5	0
98	Hempstead	36059 4096	1	647	234	241	0	0	0
99	Hempstead	36059 4096	2	701	225	224	0	0	0
100	Hempstead	36059 4096	3	662	218	230	0	0	0
101	Hempstead	36059 4096	4	724	247	254	0	0	0
102	Hempstead	36059 4096	5	1018	360	322	0	9	0
103	Oyster Bay	36059 5183	3	555	203	221	0	0	0
104	Oyster Bay	36059 5183	4	1510	536	538	0	0	0
105	Oyster Bay	36059 5184	3	2192	729	732	0	0	0
106	Oyster Bay	36059 5186	1	1201	419	426	0	0	0
107	Oyster Bay	36059 5186	2	818	262	261	0	0	0
108	Oyster Bay	36059 5186	3	978	318	319	0	0	0
109	Oyster Bay	36059 5186	4	800	268	267	0	0	0
110	Oyster Bay	36059 5186	5	541	170	164	0	0	0
111	Oyster Bay	36059 5187	1	1121	375	400	0	0	0
112	Oyster Bay	36059 5187	2	742	246	229	0	0	0
113	Oyster Bay	36059 5187	3	909	298	281	0	0	0
114	Oyster Bay	36059 5187	4	639	198	183	0	0	0
115	Oyster Bay	36059 5187	5	873	310	313	0	0	0
116	Oyster Bay	36059 5187	6	796	265	252	0	0	0

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117	Oyster Bay	36059	5187	7	722	277	311	0	0	0
118	Oyster Bay	36059	5188	1	1121	364	366	0	0	0
119	Oyster Bay	36059	5188	2	756	234	226	0	0	0
120	Oyster Bay	36059	5188	3	1475	479	485	0	0	0
121	Oyster Bay	36059	5189	1	870	362	402	0	0	0
122	Oyster Bay	36059	5189	2	643	217	211	0	0	8
123	Oyster Bay	36059	5189	3	927	313	302	0	0	0
124	Oyster Bay	36059	5189	4	830	264	261	0	0	0
125	Oyster Bay	36059	5189	5	1262	410	385	0	0	0
126	Oyster Bay	36059	5189	6	512	150	150	0	0	0
127	Oyster Bay	36059	5189	7	736	240	225	0	0	0
128	Oyster Bay	36059	5189	8	640	210	222	0	0	0
129	Oyster Bay	36059	5190	1	477	158	146	0	0	0
130	Oyster Bay	36059	5190	2	734	235	257	0	0	0
131	Oyster Bay	36059	5190	3	748	242	224	0	0	0
132	Oyster Bay	36059	5190	4	826	252	275	0	0	0
133	Oyster Bay	36059	5190	5	1055	345	353	0	0	0
134	Oyster Bay	36059	5190	6	1409	441	435	0	0	0
135	Oyster Bay	36059	5190	7	1014	319	302	0	0	0
136	Oyster Bay	36059	5191	1	732	261	276	0	0	0
137	Oyster Bay	36059	5191	2	858	290	300	0	0	0
138	Oyster Bay	36059	5191	3	738	242	250	0	0	0
139	Oyster Bay	36059	5191	4	711	249	280	0	0	0
140	Oyster Bay	36059	5191	5	1093	354	332	0	0	0
141	Oyster Bay	36059	5191	6	1175	417	364	0	0	0
142	Oyster Bay	36059	5191	7	545	181	192	0	0	0
143	Oyster Bay	36059	5192	1	619	219	218	0	0	0
144	Oyster Bay	36059	5192	2	811	264	274	0	0	0
145	Oyster Bay	36059	5192	3	806	261	255	0	0	0
146	Oyster Bay	36059	5192	4	1058	337	318	0	0	0
147	Oyster Bay	36059	5192	5	903	285	270	0	7	0
148	Oyster Bay	36059	5192	6	1143	363	339	0	0	0
149	Oyster Bay	36059	5192	7	724	236	277	0	7	0
150	Oyster Bay	36059	5193	1	1106	364	347	0	0	0
151	Oyster Bay	36059	5193	2	664	284	301	0	0	0
152	Oyster Bay	36059	5193	3	1164	435	426	0	0	0
153	Oyster Bay	36059	5193	4	1052	344	342	0	0	0
154	Oyster Bay	36059	5193	5	973	335	309	0	17	0
155	Oyster Bay	36059	5193	6	401	161	181	0	0	0
156	Oyster Bay	36059	5194	1	1196	378	372	0	0	0
157	Oyster Bay	36059	5194	2	1164	379	376	0	0	0
158	Oyster Bay	36059	5194	3	874	280	276	0	0	4
159	Oyster Bay	36059	5194	4	661	233	242	0	0	0
160	Oyster Bay	36059	5194	5	434	156	156	0	0	0
161	Oyster Bay	36059	5195	1	994	338	332	0	0	0
162	Oyster Bay	36059	5195	2	1155	368	360	0	0	0
163	Oyster Bay	36059	5195	3	662	221	226	0	0	0
164	Oyster Bay	36059	5195	4	668	222	230	0	0	0
165	Oyster Bay	36059	5195	5	533	176	168	0	0	0
166	Oyster Bay	36059	5195	6	700	213	215	0	0	0
167	Oyster Bay	36059	5195	7	1174	391	398	0	0	0
168	Oyster Bay	36059	5199	1	611	192	187	0	0	0
169	Oyster Bay	36059	5199	2	1177	383	363	0	0	0
170	Oyster Bay	36059	5199	3	1612	515	515	0	0	0
171	Oyster Bay	36059	5199	4	1087	357	347	0	0	0
172	Oyster Bay	36059	5199	5	1038	327	362	0	0	0
173	Oyster Bay	36059	5201	1	1032	424	434	0	0	0
174	Oyster Bay	36059	5201	2	991	317	303	0	0	11
175	Oyster Bay	36059	5201	3	683	236	255	0	0	0
176	Oyster Bay	36059	5201	4	1055	351	350	0	0	0
177	Oyster Bay	36059	5201	5	1495	419	375	0	0	0

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178	Oyster Bay	36059 5201	6	354	115	134	0	0	0
179	Oyster Bay	36059 5202	1	770	257	243	0	0	0
180	Oyster Bay	36059 5202	2	791	246	246	0	0	0
181	Oyster Bay	36059 5202	3	670	219	190	7	12	0
182	Oyster Bay	36059 5202	4	715	211	206	0	0	0
183	Oyster Bay	36059 5203	1	625	203	238	0	0	0
184	Oyster Bay	36059 5203	2	721	238	264	0	0	0
185	Oyster Bay	36059 5203	3	657	216	219	0	0	0
186	Oyster Bay	36059 5203	4	1218	372	379	0	0	0
187	Oyster Bay	36059 5203	5	1040	322	312	0	0	0
188	Oyster Bay	36059 5203	6	805	281	258	0	0	0
189	Oyster Bay	36059 5203	7	727	247	238	0	0	0
190	Oyster Bay	36059 5206	1	1139	375	380	0	0	0
191	Oyster Bay	36059 5207	1	675	221	222	0	0	0
192	Oyster Bay	36059 5207	2	954	318	300	0	0	0
193	Oyster Bay	36059 5207	3	943	302	299	0	0	0
194	Oyster Bay	36059 5207	4	1262	421	446	0	0	0
195	Oyster Bay	36059 5207	5	1057	315	298	0	8	4
196	Oyster Bay	36059 5208	2	1004	310	296	0	0	0
197	Oyster Bay	36059 5208	3	741	240	247	0	0	0
198	Oyster Bay	36059 5208	4	1097	341	331	0	0	0
199	Oyster Bay	36059 5208	5	1016	309	315	0	6	0
200	North Hempstead	36059 3025021		1138	352	323	0	9	15
201	North Hempstead	36059 3025022		1521	498	474	0	0	0
202	North Hempstead	36059 3042011		926	231	211	0	0	0
203	North Hempstead	36059 3042012		1512	351	359	0	0	0
204	North Hempstead	36059 3042013		565	125	107	0	0	0
205	North Hempstead	36059 3042014		1250	275	287	0	0	0
206	North Hempstead	36059 3042015		1098	318	315	0	0	0
207	North Hempstead	36059 3042016		1153	243	261	0	0	0
208	North Hempstead	36059 3042017		1048	238	241	0	0	0
209	North Hempstead	36059 3042021		640	205	247	0	0	0
210	North Hempstead	36059 3042022		0	0	0	0	0	0
211	North Hempstead	36059 3042023		9	4	0	0	0	0
212	North Hempstead	36059 3042024		238	65	76	0	0	0
213	North Hempstead	36059 3042025		328	82	77	0	0	0
214	North Hempstead	36059 3042026		875	288	255	0	0	0
215	North Hempstead	36059 3042027		615	217	206	0	0	0
216	Hempstead	36059 4078011		593	205	196	0	0	0
217	Hempstead	36059 4078012		929	302	311	0	0	0
218	Hempstead	36059 4078013		1010	378	379	0	0	0
219	Hempstead	36059 4078014		572	182	181	0	0	0
220	Hempstead	36059 4078015		659	213	204	0	0	0
221	Hempstead	36059 4078016		694	227	207	0	0	0
222	Hempstead	36059 4078017		852	266	265	0	0	0
223	Hempstead	36059 4078025		2439	166	182	0	0	0
224	Oyster Bay	36059 5177013		3155	987	1004	0	0	0
225	Oyster Bay	36059 5177051		1708	578	577	0	6	0
226	Oyster Bay	36059 5177061		752	0	0	0	0	0
227	Oyster Bay	36059 5182031		3889	1136	1136	0	0	0
228	Oyster Bay	36059 5182042		2807	1010	999	0	5	0
229	Oyster Bay	36059 5182043		1312	423	423	6	0	0
230	Oyster Bay	36059 5185011		2301	932	975	0	0	0
231	Oyster Bay	36059 5185012		1679	565	542	0	0	0
232	Oyster Bay	36059 5185013		2150	683	679	0	0	0
233	Oyster Bay	36059 5185021		1045	356	368	0	0	0
234	Oyster Bay	36059 5185022		1032	368	338	0	0	0
235	Oyster Bay	36059 5185023		696	326	344	0	0	0
236	Oyster Bay	36059 5196011		1827	588	617	0	0	5
237	Oyster Bay	36059 5196012		794	260	262	0	0	0
238	Oyster Bay	36059 5196013		858	267	257	7	0	0

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239	Oyster Bay	36059	5196014	1173	367	362	0	0	0
240	Oyster Bay	36059	5196021	664	220	210	0	0	0
241	Oyster Bay	36059	5196022	854	295	283	0	0	0
242	Oyster Bay	36059	5196023	655	222	216	0	0	0
243	Oyster Bay	36059	5197021	1444	424	451	0	0	0
244	Oyster Bay	36059	5197022	882	297	282	0	0	0
245	Oyster Bay	36059	5197023	1207	383	376	0	0	0
246	Oyster Bay	36059	5197024	1002	325	320	0	0	0
247	Oyster Bay	36059	5197031	914	299	304	0	9	0
248	Oyster Bay	36059	5197032	1090	341	348	0	0	7
249	Oyster Bay	36059	5197033	1733	568	540	0	0	0
250	Oyster Bay	36059	5197041	1466	485	491	0	0	0
251	Oyster Bay	36059	5197042	1168	385	356	0	0	0
252	Oyster Bay	36059	5197043	699	298	314	0	0	7
253	Oyster Bay	36059	5198011	422	148	143	0	0	0
254	Oyster Bay	36059	5198012	469	162	166	0	0	0
255	Oyster Bay	36059	5198013	913	340	360	0	0	0
256	Oyster Bay	36059	5198014	647	203	201	0	7	0
257	Oyster Bay	36059	5198021	1202	465	453	0	0	0
258	Oyster Bay	36059	5198022	1178	364	359	0	0	0
259	Oyster Bay	36059	5198023	1595	513	502	0	0	0
260	Oyster Bay	36059	5198024	1351	379	383	0	0	0
261	Oyster Bay	36059	5200011	546	180	166	0	0	0
262	Oyster Bay	36059	5200012	1248	404	392	0	0	0
263	Oyster Bay	36059	5200013	1345	448	459	0	0	0
264	Oyster Bay	36059	5200014	952	315	325	0	0	0
265	Oyster Bay	36059	5200015	1720	541	543	0	0	0
266	Oyster Bay	36059	5200019	204	72	75	0	0	0
267	Oyster Bay	36059	5200021	1020	306	287	0	0	0
268	Oyster Bay	36059	5200022	1393	451	436	0	0	0
269	Oyster Bay	36059	5200023	667	225	266	0	0	0
270	Oyster Bay	36059	5200024	1141	362	355	0	0	0
271	Oyster Bay	36059	5204011	994	480	490	0	0	0
272	Oyster Bay	36059	5204014	925	387	377	0	0	0
273	Oyster Bay	36059	5204015	1134	446	458	0	0	0
274	Oyster Bay	36059	5204016	993	307	289	0	0	5
275	Oyster Bay	36059	5204022	1192	428	405	0	0	0
276	Oyster Bay	36059	5204023	1990	931	949	0	0	0
277	Oyster Bay	36059	5204024	368	147	154	0	0	0
278	Oyster Bay	36059	5204025	445	194	192	0	0	0
279	Oyster Bay	36059	5205011	1182	389	400	0	0	0
280	Oyster Bay	36059	5205012	671	222	217	0	0	6
281	Oyster Bay	36059	5205013	1035	332	330	0	0	0
282	Oyster Bay	36059	5205014	798	251	241	0	0	0
283	Oyster Bay	36059	5205021	1067	360	374	0	0	0
284	Oyster Bay	36059	5205023	1217	382	350	0	0	7
285	Oyster Bay	36059	5205024	864	278	301	0	0	0
286	Oyster Bay	36059	5205025	1015	324	310	0	0	0
287	Huntington	36103	1122061	1641	479	424	0	7	6
288	Huntington	36103	1122062	613	257	251	0	0	0
289	Babylon	36103	1223019	885	42	42	0	0	0
290	Babylon	36103	1223021	1193	451	444	0	0	0
Totals:				275322	89097	88764	25	153	137

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City	Census Tract ID	Tract People	House Count	Public Water	Drilled Wells	Dug Wells	Other Sources
Babylon	36103 1223021	1193	451	444	0	0	0
Babylon	36103 1223019	885	42	42	0	0	0
Sub Totals:		2078	493	486	0	0	0
Hempstead	36059 4092 1	848	266	281	0	7	0
Hempstead	36059 4092 3	1051	321	297	0	0	0
Hempstead	36059 4092 2	1110	364	355	0	0	5
Hempstead	36059 4076 1	601	195	197	0	0	0
Hempstead	36059 4076 2	564	170	159	0	0	0
Hempstead	36059 4076 3	556	180	168	0	0	0
Hempstead	36059 4092 4	771	237	220	0	0	0
Hempstead	36059 4076 5	492	162	180	0	0	0
Hempstead	36059 4076 6	942	323	346	0	0	0
Hempstead	36059 4076 7	699	233	228	0	4	0
Hempstead	36059 4076 8	696	223	227	0	0	0
Hempstead	36059 4077 1	1212	424	431	0	0	0
Hempstead	36059 4077 2	1192	396	392	0	0	0
Hempstead	36059 4077 3	1219	404	401	0	0	0
Hempstead	36059 4077 4	955	320	334	0	0	0
Hempstead	36059 4076 4	949	324	301	0	0	0
Hempstead	36059 4082 1	920	282	255	0	0	0
Hempstead	36059 4082 2	883	274	286	0	0	0
Hempstead	36059 4082 3	787	260	267	0	0	0
Hempstead	36059 4082 4	1028	333	366	0	0	0
Hempstead	36059 4082 5	860	290	287	0	0	0
Hempstead	36059 4082 6	1030	316	286	0	0	0
Hempstead	36059 4082 7	934	295	303	0	0	0
Hempstead	36059 4083 1	1152	356	365	0	0	0
Hempstead	36059 4083 2	768	247	245	0	0	0
Hempstead	36059 4083 3	740	234	225	0	0	0
Hempstead	36059 4083 4	519	168	167	0	0	0
Hempstead	36059 4083 5	1011	324	349	0	0	0
Hempstead	36059 4083 6	945	306	301	0	0	0
Hempstead	36059 4083 7	1150	388	380	0	0	0
Hempstead	36059 4083 8	842	273	264	0	0	0
Hempstead	36059 4085 1	542	186	180	0	0	0
Hempstead	36059 4086 1	677	219	220	0	0	0
Hempstead	36059 4081 2	1376	481	470	0	0	0
Hempstead	36059 4086 3	680	221	223	0	0	0
Hempstead	36059 4086 4	897	285	292	0	0	0
Hempstead	36059 4086 5	924	359	354	0	0	0
Hempstead	36059 4086 6	682	218	219	0	0	0
Hempstead	36059 4087 1	765	247	254	0	0	0
Hempstead	36059 4087 2	827	248	250	0	0	0
Hempstead	36059 4087 3	792	253	243	0	0	0
Hempstead	36059 4087 4	856	265	270	0	0	0
Hempstead	36059 4087 5	977	304	302	0	0	0
Hempstead	36059 4087 6	740	237	235	0	0	0
Hempstead	36059 4088 1	655	224	229	0	0	9
Hempstead	36059 4088 2	948	335	319	0	0	0
Hempstead	36059 4088 3	948	295	289	0	0	0
Hempstead	36059 4088 4	999	309	322	0	7	0
Hempstead	36059 4088 5	1022	319	319	0	0	7
Hempstead	36059 4088 6	893	276	266	0	0	0
Hempstead	36059 4088 7	862	269	250	0	8	0

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Hempstead	36059	4088	8	673	204	206	0	0	0
Hempstead	36059	4089	1	1099	366	367	0	0	0
Hempstead	36059	4089	2	1173	398	396	0	0	0
Hempstead	36059	4089	3	767	242	224	0	0	0
Hempstead	36059	4089	4	932	286	264	0	0	13
Hempstead	36059	4089	5	751	218	234	0	0	0
Hempstead	36059	4089	6	1186	410	415	0	0	7
Hempstead	36059	4090	1	446	150	138	0	0	0
Hempstead	36059	4090	2	484	154	144	0	0	0
Hempstead	36059	4090	3	1124	354	340	0	4	0
Hempstead	36059	4090	4	1240	377	385	0	9	0
Hempstead	36059	4090	5	1264	364	391	0	0	0
Hempstead	36059	4090	6	665	207	186	0	0	0
Hempstead	36059	4090	7	766	234	243	0	0	0
Hempstead	36059	4091	1	1145	354	339	0	0	6
Hempstead	36059	4091	2	841	256	242	0	0	0
Hempstead	36059	4091	3	1263	386	397	0	0	0
Hempstead	36059	4091	4	1012	305	309	0	0	0
Hempstead	36059	4086	2	681	204	193	0	0	5
Hempstead	36059	4091	6	769	237	228	0	0	0
Hempstead	36059	4078013		1010	378	379	0	0	0
Hempstead	36059	4078014		572	182	181	0	0	0
Hempstead	36059	4078015		659	213	204	0	0	0
Hempstead	36059	4078016		694	227	207	0	0	0
Hempstead	36059	4092	5	602	199	194	5	0	0
Hempstead	36059	4092	6	826	263	276	0	0	0
Hempstead	36059	4092	7	1117	350	360	0	0	0
Hempstead	36059	4093	1	690	219	220	0	0	0
Hempstead	36059	4093	2	494	163	164	0	0	0
Hempstead	36059	4093	3	731	245	260	0	0	0
Hempstead	36059	4093	4	476	153	149	0	0	0
Hempstead	36059	4093	5	1019	322	312	0	0	0
Hempstead	36059	4093	6	1209	371	368	0	0	0
Hempstead	36059	4094	1	748	255	250	0	0	0
Hempstead	36059	4094	2	876	284	294	0	0	0
Hempstead	36059	4094	3	709	250	248	0	0	0
Hempstead	36059	4094	4	615	210	216	0	0	0
Hempstead	36059	4094	5	753	263	258	0	0	0
Hempstead	36059	4094	6	518	173	169	0	0	0
Hempstead	36059	4095	1	549	174	186	0	0	0
Hempstead	36059	4095	2	813	272	255	0	0	0
Hempstead	36059	4095	3	477	147	148	0	0	0
Hempstead	36059	4095	4	681	222	200	0	0	0
Hempstead	36059	4095	5	1487	460	481	0	5	0
Hempstead	36059	4096	1	647	234	241	0	0	0
Hempstead	36059	4096	2	701	225	224	0	0	0
Hempstead	36059	4096	3	662	218	230	0	0	0
Hempstead	36059	4096	4	724	247	254	0	0	0
Hempstead	36059	4096	5	1018	360	322	0	9	0
Hempstead	36059	4078017		852	266	265	0	0	0
Hempstead	36059	4091	5	691	216	233	0	0	0
Hempstead	36059	4078012		929	302	311	0	0	0
Hempstead	36059	4078025		2439	166	182	0	0	0
Hempstead	36059	4078011		593	205	196	0	0	0
Sub Totals:				90350	28578	28447	5	53	52
Huntington	36103	1122062		613	257	251	0	0	0
Huntington	36103	1122061		1641	479	424	0	7	6
Sub Totals:				2254	736	675	0	7	6

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North Hempstead	36059	3042024	238	65	76	0	0	0
North Hempstead	36059	3039 2	669	207	202	0	0	0
North Hempstead	36059	3041 2	837	259	261	0	0	0
North Hempstead	36059	3042023	9	4	0	0	0	0
North Hempstead	36059	3042025	328	82	77	0	0	0
North Hempstead	36059	3041 1	1116	347	329	0	0	0
North Hempstead	36059	3042015	1098	318	315	0	0	0
North Hempstead	36059	3041 3	1230	526	542	0	0	0
North Hempstead	36059	3042017	1048	238	241	0	0	0
North Hempstead	36059	3042021	640	205	247	0	0	0
North Hempstead	36059	3042022	0	0	0	0	0	0
North Hempstead	36059	3042011	926	231	211	0	0	0
North Hempstead	36059	3042012	1512	351	359	0	0	0
North Hempstead	36059	3042013	565	125	107	0	0	0
North Hempstead	36059	3042026	875	288	255	0	0	0
North Hempstead	36059	3042027	615	217	206	0	0	0
North Hempstead	36059	3042016	1153	243	261	0	0	0
North Hempstead	36059	3039 1	1328	389	423	0	0	0
North Hempstead	36059	3025021	1138	352	323	0	9	15
North Hempstead	36059	3025022	1521	498	474	0	0	0
North Hempstead	36059	3042014	1250	275	287	0	0	0

Sub Totals:	18096	5220	5196	0	9	15
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Oyster Bay	36059	5189 1	870	362	402	0	0	0
Oyster Bay	36059	5189 3	927	313	302	0	0	0
Oyster Bay	36059	5189 2	643	217	211	0	0	8
Oyster Bay	36059	5187 6	796	265	252	0	0	0
Oyster Bay	36059	5187 7	722	277	311	0	0	0
Oyster Bay	36059	5188 1	1121	364	366	0	0	0
Oyster Bay	36059	5188 2	756	234	226	0	0	0
Oyster Bay	36059	5188 3	1475	479	485	0	0	0
Oyster Bay	36059	5183 3	555	203	221	0	0	0
Oyster Bay	36059	5183 4	1510	536	538	0	0	0
Oyster Bay	36059	5184 3	2192	729	732	0	0	0
Oyster Bay	36059	5189 4	830	264	261	0	0	0
Oyster Bay	36059	5189 5	1262	410	385	0	0	0
Oyster Bay	36059	5189 6	512	150	150	0	0	0
Oyster Bay	36059	5189 7	736	240	225	0	0	0
Oyster Bay	36059	5186 5	541	170	164	0	0	0
Oyster Bay	36059	5187 1	1121	375	400	0	0	0
Oyster Bay	36059	5187 2	742	246	229	0	0	0
Oyster Bay	36059	5187 3	909	298	281	0	0	0
Oyster Bay	36059	5187 4	639	198	183	0	0	0
Oyster Bay	36059	5187 5	873	310	313	0	0	0
Oyster Bay	36059	5193 3	1164	435	426	0	0	0
Oyster Bay	36059	5193 4	1052	344	342	0	0	0
Oyster Bay	36059	5193 5	973	335	309	0	17	0
Oyster Bay	36059	5193 6	401	161	181	0	0	0
Oyster Bay	36059	5194 1	1196	378	372	0	0	0
Oyster Bay	36059	5194 2	1164	379	376	0	0	0
Oyster Bay	36059	5194 3	874	280	276	0	0	4
Oyster Bay	36059	5194 4	661	233	242	0	0	0
Oyster Bay	36059	5194 5	434	156	156	0	0	0
Oyster Bay	36059	5195 1	994	338	332	0	0	0
Oyster Bay	36059	5195 2	1155	368	360	0	0	0
Oyster Bay	36059	5195 3	662	221	226	0	0	0
Oyster Bay	36059	5195 4	668	222	230	0	0	0
Oyster Bay	36059	5195 5	533	176	168	0	0	0
Oyster Bay	36059	5195 6	700	213	215	0	0	0
Oyster Bay	36059	5195 7	1174	391	398	0	0	0

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Oyster Bay	36059	5199	1	611	192	187	0	0	0
Oyster Bay	36059	5199	2	1177	383	363	0	0	0
Oyster Bay	36059	5199	3	1612	515	515	0	0	0
Oyster Bay	36059	5199	4	1087	357	347	0	0	0
Oyster Bay	36059	5199	5	1038	327	362	0	0	0
Oyster Bay	36059	5201	1	1032	424	434	0	0	0
Oyster Bay	36059	5201	2	991	317	303	0	0	11
Oyster Bay	36059	5201	3	683	236	255	0	0	0
Oyster Bay	36059	5201	4	1055	351	350	0	0	0
Oyster Bay	36059	5201	5	1495	419	375	0	0	0
Oyster Bay	36059	5186	1	1201	419	426	0	0	0
Oyster Bay	36059	5186	2	818	262	261	0	0	0
Oyster Bay	36059	5186	3	978	318	319	0	0	0
Oyster Bay	36059	5186	4	800	268	267	0	0	0
Oyster Bay	36059	5202	4	715	211	206	0	0	0
Oyster Bay	36059	5203	1	625	203	238	0	0	0
Oyster Bay	36059	5203	2	721	238	264	0	0	0
Oyster Bay	36059	5203	3	657	216	219	0	0	0
Oyster Bay	36059	5203	4	1218	372	379	0	0	0
Oyster Bay	36059	5203	5	1040	322	312	0	0	0
Oyster Bay	36059	5203	6	805	281	258	0	0	0
Oyster Bay	36059	5203	7	727	247	238	0	0	0
Oyster Bay	36059	5206	1	1139	375	380	0	0	0
Oyster Bay	36059	5207	1	675	221	222	0	0	0
Oyster Bay	36059	5207	2	954	318	300	0	0	0
Oyster Bay	36059	5207	3	943	302	299	0	0	0
Oyster Bay	36059	5207	4	1262	421	446	0	0	0
Oyster Bay	36059	5207	5	1057	315	298	0	8	4
Oyster Bay	36059	5208	2	1004	310	296	0	0	0
Oyster Bay	36059	5208	3	741	240	247	0	0	0
Oyster Bay	36059	5208	4	1097	341	331	0	0	0
Oyster Bay	36059	5208	5	1016	309	315	0	6	0
Oyster Bay	36059	5189	8	640	210	222	0	0	0
Oyster Bay	36059	5190	1	477	158	146	0	0	0
Oyster Bay	36059	5190	2	734	235	257	0	0	0
Oyster Bay	36059	5190	3	748	242	224	0	0	0
Oyster Bay	36059	5190	4	826	252	275	0	0	0
Oyster Bay	36059	5190	5	1055	345	353	0	0	0
Oyster Bay	36059	5190	6	1409	441	435	0	0	0
Oyster Bay	36059	5190	7	1014	319	302	0	0	0
Oyster Bay	36059	5191	1	732	261	276	0	0	0
Oyster Bay	36059	5191	2	858	290	300	0	0	0
Oyster Bay	36059	5191	3	738	242	250	0	0	0
Oyster Bay	36059	5191	4	711	249	280	0	0	0
Oyster Bay	36059	5191	5	1093	354	332	0	0	0
Oyster Bay	36059	5191	6	1175	417	364	0	0	0
Oyster Bay	36059	5201	6	354	115	134	0	0	0
Oyster Bay	36059	5202	1	770	257	243	0	0	0
Oyster Bay	36059	5202	2	791	246	246	0	0	0
Oyster Bay	36059	5202	3	670	219	190	7	12	0
Oyster Bay	36059	5192	4	1058	337	318	0	0	0
Oyster Bay	36059	5192	5	903	285	270	0	7	0
Oyster Bay	36059	5192	6	1143	363	339	0	0	0
Oyster Bay	36059	5192	7	724	236	277	0	7	0
Oyster Bay	36059	5193	1	1106	364	347	0	0	0
Oyster Bay	36059	5193	2	664	284	301	0	0	0
Oyster Bay	36059	5177013		3155	987	1004	0	0	0
Oyster Bay	36059	5177051		1708	578	577	0	6	0
Oyster Bay	36059	5177061		752	0	0	0	0	0
Oyster Bay	36059	5182031		3889	1136	1136	0	0	0
Oyster Bay	36059	5182042		2807	1010	999	0	5	0

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Oyster Bay	36059	5182043	1312	423	423	6	0	0
Oyster Bay	36059	5185011	2301	932	975	0	0	0
Oyster Bay	36059	5185012	1679	565	542	0	0	0
Oyster Bay	36059	5185013	2150	683	679	0	0	0
Oyster Bay	36059	5185021	1045	356	368	0	0	0
Oyster Bay	36059	5185022	1032	368	338	0	0	0
Oyster Bay	36059	5185023	696	326	344	0	0	0
Oyster Bay	36059	5196011	1827	588	617	0	0	5
Oyster Bay	36059	5196012	794	260	262	0	0	0
Oyster Bay	36059	5196013	858	267	257	7	0	0
Oyster Bay	36059	5196014	1173	367	362	0	0	0
Oyster Bay	36059	5196021	664	220	210	0	0	0
Oyster Bay	36059	5196022	854	295	283	0	0	0
Oyster Bay	36059	5196023	655	222	216	0	0	0
Oyster Bay	36059	5197021	1444	424	451	0	0	0
Oyster Bay	36059	5197022	882	297	282	0	0	0
Oyster Bay	36059	5197023	1207	383	376	0	0	0
Oyster Bay	36059	5197024	1002	325	320	0	0	0
Oyster Bay	36059	5197031	914	299	304	0	9	0
Oyster Bay	36059	5197032	1090	341	348	0	0	7
Oyster Bay	36059	5197033	1733	568	540	0	0	0
Oyster Bay	36059	5197041	1466	485	491	0	0	0
Oyster Bay	36059	5197042	1168	385	356	0	0	0
Oyster Bay	36059	5197043	699	298	314	0	0	7
Oyster Bay	36059	5198011	422	148	143	0	0	0
Oyster Bay	36059	5198012	469	162	166	0	0	0
Oyster Bay	36059	5198013	913	340	360	0	0	0
Oyster Bay	36059	5198014	647	203	201	0	7	0
Oyster Bay	36059	5198021	1202	465	453	0	0	0
Oyster Bay	36059	5198022	1178	364	359	0	0	0
Oyster Bay	36059	5198023	1595	513	502	0	0	0
Oyster Bay	36059	5198024	1351	379	383	0	0	0
Oyster Bay	36059	5200011	546	180	166	0	0	0
Oyster Bay	36059	5200012	1248	404	392	0	0	0
Oyster Bay	36059	5200013	1345	448	459	0	0	0
Oyster Bay	36059	5200014	952	315	325	0	0	0
Oyster Bay	36059	5200015	1720	541	543	0	0	0
Oyster Bay	36059	5200019	204	72	75	0	0	0
Oyster Bay	36059	5200021	1020	306	287	0	0	0
Oyster Bay	36059	5200022	1393	451	436	0	0	0
Oyster Bay	36059	5200023	667	225	266	0	0	0
Oyster Bay	36059	5200024	1141	362	355	0	0	0
Oyster Bay	36059	5204011	994	480	490	0	0	0
Oyster Bay	36059	5204014	925	387	377	0	0	0
Oyster Bay	36059	5204015	1134	446	458	0	0	0
Oyster Bay	36059	5204016	993	307	289	0	0	5
Oyster Bay	36059	5204022	1192	428	405	0	0	0
Oyster Bay	36059	5204023	1990	931	949	0	0	0
Oyster Bay	36059	5204024	368	147	154	0	0	0
Oyster Bay	36059	5204025	445	194	192	0	0	0
Oyster Bay	36059	5205011	1182	389	400	0	0	0
Oyster Bay	36059	5205012	671	222	217	0	0	6
Oyster Bay	36059	5205013	1035	332	330	0	0	0
Oyster Bay	36059	5205014	798	251	241	0	0	0
Oyster Bay	36059	5205021	1067	360	374	0	0	0
Oyster Bay	36059	5205023	1217	382	350	0	0	7
Oyster Bay	36059	5205024	864	278	301	0	0	0
Oyster Bay	36059	5205025	1015	324	310	0	0	0
Oyster Bay	36059	5191 7	545	181	192	0	0	0
Oyster Bay	36059	5192 1	619	219	218	0	0	0
Oyster Bay	36059	5192 2	811	264	274	0	0	0

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Oyster Bay	36059	5192	3	806	261	255	0	0	0
Sub Totals:				162544	54070	53960	20	84	64

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For Radius of 4 Mi., Circle Area = 50.265482

No.	City	Block Group ID	Total Area	Partial Area	% Within Radius
1	North Hempstead	36059 30391	0.199119	0.199119	100.00
2	North Hempstead	36059 30392	0.205858	0.134329	65.25
3	North Hempstead	36059 30411	0.224032	0.224032	100.00
4	North Hempstead	36059 30412	0.119493	0.108715	90.98
5	North Hempstead	36059 30413	0.322895	0.043984	13.62
6	Hempstead	36059 40761	0.055138	0.055138	100.00
7	Hempstead	36059 40762	0.046551	0.046551	100.00
8	Hempstead	36059 40763	0.044554	0.044554	100.00
9	Hempstead	36059 40764	0.152103	0.152103	100.00
10	Hempstead	36059 40765	0.088455	0.088455	100.00
11	Hempstead	36059 40766	0.137822	0.137822	100.00
12	Hempstead	36059 40767	0.106256	0.106256	100.00
13	Hempstead	36059 40768	0.122655	0.122655	100.00
14	Hempstead	36059 40771	0.205903	0.205903	100.00
15	Hempstead	36059 40772	0.180853	0.180853	100.00
16	Hempstead	36059 40773	0.137358	0.137358	100.00
17	Hempstead	36059 40774	1.730301	0.932928	53.92
18	Hempstead	36059 40812	0.227679	0.078836	34.63
19	Hempstead	36059 40821	0.109202	0.109202	100.00
20	Hempstead	36059 40822	0.111388	0.083212	74.70
21	Hempstead	36059 40823	0.087919	0.021982	25.00
22	Hempstead	36059 40824	0.093878	0.093878	100.00
23	Hempstead	36059 40825	0.085747	0.085747	100.00
24	Hempstead	36059 40826	0.095135	0.095135	100.00
25	Hempstead	36059 40827	0.207630	0.135487	65.25
26	Hempstead	36059 40831	0.162248	0.162248	100.00
27	Hempstead	36059 40832	0.079023	0.079023	100.00
28	Hempstead	36059 40833	0.089966	0.089966	100.00
29	Hempstead	36059 40834	0.055497	0.055497	100.00
30	Hempstead	36059 40835	0.105828	0.064341	60.80
31	Hempstead	36059 40836	0.113770	0.113770	100.00
32	Hempstead	36059 40837	0.096992	0.096992	100.00
33	Hempstead	36059 40838	0.097781	0.097781	100.00
34	Hempstead	36059 40851	0.066879	0.015469	23.13
35	Hempstead	36059 40861	0.070682	0.070682	100.00
36	Hempstead	36059 40862	0.080089	0.080089	100.00
37	Hempstead	36059 40863	0.060201	0.060201	100.00
38	Hempstead	36059 40864	0.107068	0.107068	100.00
39	Hempstead	36059 40865	0.089471	0.089471	100.00
40	Hempstead	36059 40866	0.147746	0.147746	100.00
41	Hempstead	36059 40871	0.076625	0.076625	100.00
42	Hempstead	36059 40872	0.091785	0.091785	100.00
43	Hempstead	36059 40873	0.084517	0.084517	100.00
44	Hempstead	36059 40874	0.071589	0.071589	100.00
45	Hempstead	36059 40875	0.124207	0.124207	100.00
46	Hempstead	36059 40876	0.077009	0.077009	100.00
47	Hempstead	36059 40881	0.089193	0.089193	100.00
48	Hempstead	36059 40882	0.131833	0.131833	100.00
49	Hempstead	36059 40883	0.109558	0.109558	100.00
50	Hempstead	36059 40884	0.113519	0.113519	100.00
51	Hempstead	36059 40885	0.097564	0.097564	100.00
52	Hempstead	36059 40886	0.136047	0.136047	100.00
53	Hempstead	36059 40887	0.077172	0.077172	100.00

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54 Hempstead	36059 40888	0.076288	0.076288	100.00
55 Hempstead	36059 40891	0.136360	0.136360	100.00
56 Hempstead	36059 40892	0.195789	0.195789	100.00
57 Hempstead	36059 40893	0.076856	0.076856	100.00
58 Hempstead	36059 40894	0.095878	0.095878	100.00
59 Hempstead	36059 40895	0.127432	0.127432	100.00
60 Hempstead	36059 40896	0.138029	0.138029	100.00
61 Hempstead	36059 40901	0.075644	0.075644	100.00
62 Hempstead	36059 40902	0.080647	0.080647	100.00
63 Hempstead	36059 40903	0.188461	0.188461	100.00
64 Hempstead	36059 40904	0.123180	0.123180	100.00
65 Hempstead	36059 40905	0.239702	0.239702	100.00
66 Hempstead	36059 40906	0.064386	0.064386	100.00
67 Hempstead	36059 40907	0.109326	0.109326	100.00
68 Hempstead	36059 40911	0.109615	0.109615	100.00
69 Hempstead	36059 40912	0.076671	0.076671	100.00
70 Hempstead	36059 40913	0.142770	0.142770	100.00
71 Hempstead	36059 40914	0.170358	0.170358	100.00
72 Hempstead	36059 40915	0.142906	0.142906	100.00
73 Hempstead	36059 40916	0.105241	0.105241	100.00
74 Hempstead	36059 40921	0.073122	0.073122	100.00
75 Hempstead	36059 40922	0.124461	0.124461	100.00
76 Hempstead	36059 40923	0.138712	0.138712	100.00
77 Hempstead	36059 40924	0.096436	0.096436	100.00
78 Hempstead	36059 40925	0.105628	0.105628	100.00
79 Hempstead	36059 40926	0.092874	0.092874	100.00
80 Hempstead	36059 40927	0.120400	0.120400	100.00
81 Hempstead	36059 40931	0.062026	0.062026	100.00
82 Hempstead	36059 40932	0.071742	0.071742	100.00
83 Hempstead	36059 40933	0.060360	0.060360	100.00
84 Hempstead	36059 40934	0.111259	0.111259	100.00
85 Hempstead	36059 40935	0.128160	0.128160	100.00
86 Hempstead	36059 40936	0.104986	0.104986	100.00
87 Hempstead	36059 40941	0.092338	0.092338	100.00
88 Hempstead	36059 40942	0.102519	0.102519	100.00
89 Hempstead	36059 40943	0.094464	0.094464	100.00
90 Hempstead	36059 40944	0.085652	0.085652	100.00
91 Hempstead	36059 40945	0.097601	0.097601	100.00
92 Hempstead	36059 40946	0.053752	0.053752	100.00
93 Hempstead	36059 40951	0.063306	0.063306	100.00
94 Hempstead	36059 40952	0.088576	0.088576	100.00
95 Hempstead	36059 40953	0.078635	0.054814	69.71
96 Hempstead	36059 40954	0.118734	0.109495	92.22
97 Hempstead	36059 40955	0.205794	0.159529	77.52
98 Hempstead	36059 40961	0.145237	0.066007	45.45
99 Hempstead	36059 40962	0.063930	0.014600	22.84
100 Hempstead	36059 40963	0.060939	0.060601	99.45
101 Hempstead	36059 40964	0.075095	0.075095	100.00
102 Hempstead	36059 40965	0.242353	0.090641	37.40
103 Oyster Bay	36059 51833	0.186458	0.075968	40.74
104 Oyster Bay	36059 51834	0.282916	0.250362	88.49
105 Oyster Bay	36059 51843	0.400287	0.261583	65.35
106 Oyster Bay	36059 51861	0.304429	0.304429	100.00
107 Oyster Bay	36059 51862	0.125052	0.125052	100.00
108 Oyster Bay	36059 51863	0.119067	0.119067	100.00
109 Oyster Bay	36059 51864	0.134772	0.134772	100.00
110 Oyster Bay	36059 51865	0.305200	0.305200	100.00
111 Oyster Bay	36059 51871	0.249233	0.249233	100.00
112 Oyster Bay	36059 51872	0.159170	0.159170	100.00
113 Oyster Bay	36059 51873	0.107871	0.107871	100.00
114 Oyster Bay	36059 51874	0.116976	0.116976	100.00

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115 Oyster Bay	36059 51875	0.133729	0.133729	100.00
116 Oyster Bay	36059 51876	0.093354	0.093354	100.00
117 Oyster Bay	36059 51877	0.545886	0.545886	100.00
118 Oyster Bay	36059 51881	0.198569	0.198569	100.00
119 Oyster Bay	36059 51882	0.280620	0.280620	100.00
120 Oyster Bay	36059 51883	0.161841	0.161841	100.00
121 Oyster Bay	36059 51891	0.081308	0.081308	100.00
122 Oyster Bay	36059 51892	0.227791	0.227791	100.00
123 Oyster Bay	36059 51893	0.085302	0.085302	100.00
124 Oyster Bay	36059 51894	0.073325	0.073325	100.00
125 Oyster Bay	36059 51895	0.499899	0.499899	100.00
126 Oyster Bay	36059 51896	0.275932	0.275932	100.00
127 Oyster Bay	36059 51897	0.089817	0.089817	100.00
128 Oyster Bay	36059 51898	0.280384	0.280384	100.00
129 Oyster Bay	36059 51901	0.083810	0.083810	100.00
130 Oyster Bay	36059 51902	0.075176	0.075176	100.00
131 Oyster Bay	36059 51903	0.100350	0.100350	100.00
132 Oyster Bay	36059 51904	0.105560	0.105560	100.00
133 Oyster Bay	36059 51905	0.210141	0.210141	100.00
134 Oyster Bay	36059 51906	0.179966	0.179966	100.00
135 Oyster Bay	36059 51907	0.140507	0.140507	100.00
136 Oyster Bay	36059 51911	0.103650	0.103650	100.00
137 Oyster Bay	36059 51912	0.097865	0.097865	100.00
138 Oyster Bay	36059 51913	0.082822	0.082822	100.00
139 Oyster Bay	36059 51914	0.079581	0.079581	100.00
140 Oyster Bay	36059 51915	0.135434	0.135434	100.00
141 Oyster Bay	36059 51916	0.175401	0.175401	100.00
142 Oyster Bay	36059 51917	0.109152	0.109152	100.00
143 Oyster Bay	36059 51921	0.153339	0.153339	100.00
144 Oyster Bay	36059 51922	0.097000	0.097000	100.00
145 Oyster Bay	36059 51923	0.093232	0.093232	100.00
146 Oyster Bay	36059 51924	0.115787	0.115787	100.00
147 Oyster Bay	36059 51925	0.097220	0.097220	100.00
148 Oyster Bay	36059 51926	0.119552	0.119552	100.00
149 Oyster Bay	36059 51927	0.095958	0.095958	100.00
150 Oyster Bay	36059 51931	0.243480	0.243480	100.00
151 Oyster Bay	36059 51932	0.098813	0.098813	100.00
152 Oyster Bay	36059 51933	0.147262	0.147262	100.00
153 Babylon	36103 1223021	1.738215	0.155140	8.93
154 Oyster Bay	36059 51935	0.381956	0.381956	100.00
155 Oyster Bay	36059 51936	0.117441	0.117441	100.00
156 Oyster Bay	36059 51941	0.142372	0.142372	100.00
157 Oyster Bay	36059 51942	0.134401	0.134401	100.00
158 Oyster Bay	36059 51943	0.083054	0.083054	100.00
159 Oyster Bay	36059 51944	0.069508	0.069508	100.00
160 Oyster Bay	36059 51945	0.052337	0.052337	100.00
161 Oyster Bay	36059 51951	0.158513	0.158513	100.00
162 Oyster Bay	36059 51952	0.167513	0.167513	100.00
163 Oyster Bay	36059 51953	0.080802	0.080802	100.00
164 Oyster Bay	36059 51954	0.061858	0.061858	100.00
165 Oyster Bay	36059 51955	0.041086	0.041086	100.00
166 Oyster Bay	36059 51956	0.069092	0.069092	100.00
167 Oyster Bay	36059 51957	0.190807	0.190807	100.00
168 Oyster Bay	36059 51991	0.175409	0.175409	100.00
169 Oyster Bay	36059 51992	0.141501	0.141501	100.00
170 Oyster Bay	36059 51993	0.241770	0.241770	100.00
171 Oyster Bay	36059 51994	0.113201	0.113201	100.00
172 Oyster Bay	36059 51995	0.139898	0.139898	100.00
173 Oyster Bay	36059 52011	2.987085	2.987085	100.00
174 Oyster Bay	36059 52012	0.195238	0.195238	100.00
175 Oyster Bay	36059 52013	0.115091	0.115091	100.00

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176 Oyster Bay	36059 52014	0.139730	0.139730	100.00
177 Oyster Bay	36059 52015	0.480532	0.480532	100.00
178 Oyster Bay	36059 52016	0.057815	0.057814	100.00
179 Oyster Bay	36059 52021	0.197382	0.197382	100.00
180 Oyster Bay	36059 52022	0.086460	0.086460	100.00
181 Oyster Bay	36059 52023	0.104830	0.104830	100.00
182 Oyster Bay	36059 52024	0.156316	0.156316	100.00
183 Oyster Bay	36059 52031	0.129270	0.129270	100.00
184 Oyster Bay	36059 52032	0.089549	0.089549	100.00
185 Oyster Bay	36059 52033	0.066072	0.066072	100.00
186 Oyster Bay	36059 52034	0.189521	0.189521	100.00
187 Oyster Bay	36059 52035	0.146510	0.146510	100.00
188 Oyster Bay	36059 52036	0.145339	0.145339	100.00
189 Oyster Bay	36059 52037	0.084055	0.084055	100.00
190 Oyster Bay	36059 52061	0.129884	0.002066	1.59
191 Oyster Bay	36059 52071	0.105939	0.055054	51.97
192 Oyster Bay	36059 52072	0.095922	0.095922	100.00
193 Oyster Bay	36059 52073	0.131273	0.123448	94.04
194 Oyster Bay	36059 52074	0.162016	0.162016	100.00
195 Oyster Bay	36059 52075	0.145038	0.145038	100.00
196 Oyster Bay	36059 52082	0.097225	0.020306	20.89
197 Oyster Bay	36059 52083	0.138302	0.048022	34.72
198 Oyster Bay	36059 52084	0.106954	0.092693	86.67
199 Oyster Bay	36059 52085	0.154929	0.149828	96.71
200 North Hempstead	36059 3025021	2.221956	0.040539	1.82
201 North Hempstead	36059 3025022	3.169956	0.247507	7.81
202 North Hempstead	36059 3042011	0.089801	0.089801	100.00
203 North Hempstead	36059 3042012	0.134217	0.134217	100.00
204 North Hempstead	36059 3042013	0.039955	0.039955	100.00
205 North Hempstead	36059 3042014	0.103017	0.103017	100.00
206 North Hempstead	36059 3042015	0.113205	0.113205	100.00
207 North Hempstead	36059 3042016	0.067987	0.067987	100.00
208 North Hempstead	36059 3042017	0.106921	0.106921	100.00
209 North Hempstead	36059 3042021	0.189944	0.189944	100.00
210 North Hempstead	36059 3042022	0.175489	0.175489	100.00
211 North Hempstead	36059 3042023	0.079550	0.079550	100.00
212 North Hempstead	36059 3042024	0.052875	0.052875	100.00
213 North Hempstead	36059 3042025	0.071374	0.071374	100.00
214 North Hempstead	36059 3042026	0.103197	0.103197	100.00
215 North Hempstead	36059 3042027	0.097817	0.097817	100.00
216 Hempstead	36059 4078011	0.113872	0.113872	100.00
217 Hempstead	36059 4078012	0.097152	0.097152	100.00
218 Hempstead	36059 4078013	0.129431	0.129431	100.00
219 Hempstead	36059 4078014	0.070470	0.070470	100.00
220 Hempstead	36059 4078015	0.075502	0.075502	100.00
221 Hempstead	36059 4078016	0.080126	0.080126	100.00
222 Hempstead	36059 4078017	0.200642	0.200642	100.00
223 Hempstead	36059 4078025	0.199284	0.199284	100.00
224 Oyster Bay	36059 5177013	6.105113	1.243075	20.36
225 Oyster Bay	36059 5177051	3.345040	0.626075	18.72
226 Oyster Bay	36059 5177061	1.186618	0.622871	52.49
227 Oyster Bay	36059 5182031	2.639794	0.156061	5.91
228 Oyster Bay	36059 5182042	1.804216	1.054270	58.43
229 Oyster Bay	36059 5182043	0.576702	0.576702	100.00
230 Oyster Bay	36059 5185011	1.314818	1.314818	100.00
231 Oyster Bay	36059 5185012	0.378417	0.378417	100.00
232 Oyster Bay	36059 5185013	0.625477	0.624149	99.79
233 Oyster Bay	36059 5185021	0.225955	0.225955	100.00
234 Oyster Bay	36059 5185022	0.125010	0.125010	100.00
235 Oyster Bay	36059 5185023	0.090640	0.090640	100.00
236 Oyster Bay	36059 5196011	0.305378	0.305378	100.00

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237 Oyster Bay	36059 5196012	0.075174	0.075174	100.00
238 Oyster Bay	36059 5196013	0.069034	0.069034	100.00
239 Oyster Bay	36059 5196014	0.121266	0.121266	100.00
240 Oyster Bay	36059 5196021	0.125211	0.125211	100.00
241 Oyster Bay	36059 5196022	0.115313	0.115313	100.00
242 Oyster Bay	36059 5196023	0.125271	0.125271	100.00
243 Oyster Bay	36059 5197021	1.405407	1.355876	96.48
244 Oyster Bay	36059 5197022	0.501175	0.501175	100.00
245 Oyster Bay	36059 5197023	0.129265	0.129265	100.00
246 Oyster Bay	36059 5197024	0.232318	0.232318	100.00
247 Oyster Bay	36059 5197031	0.168414	0.168414	100.00
248 Oyster Bay	36059 5197032	0.156403	0.156403	100.00
249 Oyster Bay	36059 5197033	0.261772	0.261772	100.00
250 Oyster Bay	36059 5197041	0.192907	0.192907	100.00
251 Oyster Bay	36059 5197042	0.196319	0.196319	100.00
252 Oyster Bay	36059 5197043	0.163440	0.163440	100.00
253 Oyster Bay	36059 5198011	0.063938	0.063938	100.00
254 Oyster Bay	36059 5198012	0.058995	0.058995	100.00
255 Oyster Bay	36059 5198013	0.122525	0.122525	100.00
256 Oyster Bay	36059 5198014	0.081924	0.081924	100.00
257 Oyster Bay	36059 5198021	0.185268	0.185268	100.00
258 Oyster Bay	36059 5198022	0.195700	0.195700	100.00
259 Oyster Bay	36059 5198023	0.224770	0.224770	100.00
260 Oyster Bay	36059 5198024	0.212027	0.212027	100.00
261 Oyster Bay	36059 5200011	0.526965	0.526965	100.00
262 Oyster Bay	36059 5200012	0.099471	0.099471	100.00
263 Oyster Bay	36059 5200013	0.140007	0.140007	100.00
264 Oyster Bay	36059 5200014	0.099714	0.099714	100.00
265 Oyster Bay	36059 5200015	0.219560	0.219560	100.00
266 Oyster Bay	36059 5200019	0.593226	0.593226	100.00
267 Oyster Bay	36059 5200021	0.528013	0.528013	100.00
268 Oyster Bay	36059 5200022	0.262306	0.262306	100.00
269 Oyster Bay	36059 5200023	0.100961	0.100961	100.00
270 Oyster Bay	36059 5200024	0.170939	0.170939	100.00
271 Oyster Bay	36059 5204011	0.143540	0.143540	100.00
272 Oyster Bay	36059 5204014	0.066313	0.066313	100.00
273 Oyster Bay	36059 5204015	0.200392	0.200392	100.00
274 Oyster Bay	36059 5204016	0.182374	0.182374	100.00
275 Oyster Bay	36059 5204022	0.121367	0.014452	11.91
276 Oyster Bay	36059 5204023	0.216543	0.159842	73.82
277 Oyster Bay	36059 5204024	0.090465	0.090465	100.00
278 Oyster Bay	36059 5204025	0.071823	0.071823	100.00
279 Oyster Bay	36059 5205011	0.228321	0.228321	100.00
280 Oyster Bay	36059 5205012	0.062997	0.058723	93.22
281 Oyster Bay	36059 5205013	0.121829	0.121829	100.00
282 Oyster Bay	36059 5205014	0.146155	0.146155	100.00
283 Oyster Bay	36059 5205021	0.111848	0.010771	9.63
284 Oyster Bay	36059 5205023	0.320658	0.032502	10.14
285 Oyster Bay	36059 5205024	0.155530	0.069627	44.77
286 Oyster Bay	36059 5205025	0.107133	0.083726	78.15
287 Huntington	36103 1122061	1.889321	0.292860	15.50
288 Huntington	36103 1122062	3.637503	1.374197	37.78
289 Babylon	36103 1223019	0.328728	0.214031	65.11
290 Oyster Bay	36059 51934	0.333448	0.333448	100.00
Totals:		75.603859	50.265388	

For Radius of 3 Mi., Circle Area = 28.274334

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No.	City	Block Group ID	Total Area	Partial Area	% Within Radius
6	Hempstead	36059 40761	0.055138	0.014214	25.78
7	Hempstead	36059 40762	0.046551	0.040903	87.87
8	Hempstead	36059 40763	0.044554	0.032204	72.28
9	Hempstead	36059 40764	0.152103	0.000000	0.00
14	Hempstead	36059 40771	0.205903	0.205827	99.96
15	Hempstead	36059 40772	0.180853	0.145462	80.43
16	Hempstead	36059 40773	0.137358	0.000537	0.39
17	Hempstead	36059 40774	1.730301	0.007449	0.43
26	Hempstead	36059 40831	0.162248	0.002310	1.42
35	Hempstead	36059 40861	0.070682	0.070682	100.00
36	Hempstead	36059 40862	0.080089	0.080089	100.00
37	Hempstead	36059 40863	0.060201	0.060201	100.00
38	Hempstead	36059 40864	0.107068	0.107068	100.00
39	Hempstead	36059 40865	0.089471	0.089471	100.00
40	Hempstead	36059 40866	0.147746	0.147746	100.00
41	Hempstead	36059 40871	0.076625	0.076625	100.00
42	Hempstead	36059 40872	0.091785	0.091785	100.00
43	Hempstead	36059 40873	0.084517	0.084517	100.00
44	Hempstead	36059 40874	0.071589	0.071589	100.00
45	Hempstead	36059 40875	0.124207	0.124207	100.00
46	Hempstead	36059 40876	0.077009	0.077009	100.00
47	Hempstead	36059 40881	0.089193	0.089193	100.00
48	Hempstead	36059 40882	0.131833	0.131833	100.00
49	Hempstead	36059 40883	0.109558	0.109558	100.00
50	Hempstead	36059 40884	0.113519	0.113519	100.00
51	Hempstead	36059 40885	0.097564	0.097564	100.00
52	Hempstead	36059 40886	0.136047	0.136047	100.00
53	Hempstead	36059 40887	0.077172	0.077172	100.00
54	Hempstead	36059 40888	0.076288	0.076288	100.00
55	Hempstead	36059 40891	0.136360	0.136360	100.00
56	Hempstead	36059 40892	0.195789	0.195789	100.00
57	Hempstead	36059 40893	0.076856	0.076856	100.00
58	Hempstead	36059 40894	0.095878	0.095878	100.00
59	Hempstead	36059 40895	0.127432	0.127432	100.00
60	Hempstead	36059 40896	0.138029	0.138029	100.00
61	Hempstead	36059 40901	0.075644	0.075644	100.00
62	Hempstead	36059 40902	0.080647	0.080647	100.00
63	Hempstead	36059 40903	0.188461	0.188461	100.00
64	Hempstead	36059 40904	0.123180	0.123180	100.00
65	Hempstead	36059 40905	0.239702	0.239702	100.00
66	Hempstead	36059 40906	0.064386	0.064386	100.00
67	Hempstead	36059 40907	0.109326	0.109326	100.00
71	Hempstead	36059 40914	0.170358	0.021609	12.68
72	Hempstead	36059 40915	0.142906	0.047782	33.44
73	Hempstead	36059 40916	0.105241	0.105241	100.00
74	Hempstead	36059 40921	0.073122	0.073122	100.00
75	Hempstead	36059 40922	0.124461	0.124461	100.00
76	Hempstead	36059 40923	0.138712	0.130866	94.34
77	Hempstead	36059 40924	0.096436	0.096436	100.00
78	Hempstead	36059 40925	0.105628	0.105628	100.00
79	Hempstead	36059 40926	0.092874	0.045103	48.56
80	Hempstead	36059 40927	0.120400	0.110221	91.55
81	Hempstead	36059 40931	0.062026	0.017978	28.99
86	Hempstead	36059 40936	0.104986	0.001139	1.09
87	Hempstead	36059 40941	0.092338	0.050364	54.54
92	Hempstead	36059 40946	0.053752	0.038403	71.45
93	Hempstead	36059 40951	0.063306	0.021955	34.68
106	Oyster Bay	36059 51861	0.304429	0.271589	89.21

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107 Oyster Bay	36059 51862	0.125052	0.125052	100.00
108 Oyster Bay	36059 51863	0.119067	0.119067	100.00
109 Oyster Bay	36059 51864	0.134772	0.134772	100.00
110 Oyster Bay	36059 51865	0.305200	0.305200	100.00
111 Oyster Bay	36059 51871	0.249233	0.031764	12.74
112 Oyster Bay	36059 51872	0.159170	0.049500	31.10
113 Oyster Bay	36059 51873	0.107871	0.063918	59.25
114 Oyster Bay	36059 51874	0.116976	0.108109	92.42
115 Oyster Bay	36059 51875	0.133729	0.000001	0.00
116 Oyster Bay	36059 51876	0.093354	0.032323	34.62
117 Oyster Bay	36059 51877	0.545886	0.290752	53.26
118 Oyster Bay	36059 51881	0.198569	0.198569	100.00
119 Oyster Bay	36059 51882	0.280620	0.280620	100.00
120 Oyster Bay	36059 51883	0.161841	0.161841	100.00
121 Oyster Bay	36059 51891	0.081308	0.081308	100.00
122 Oyster Bay	36059 51892	0.227791	0.227791	100.00
123 Oyster Bay	36059 51893	0.085302	0.085302	100.00
124 Oyster Bay	36059 51894	0.073325	0.073325	100.00
125 Oyster Bay	36059 51895	0.499899	0.499899	100.00
126 Oyster Bay	36059 51896	0.275932	0.275932	100.00
127 Oyster Bay	36059 51897	0.089817	0.089817	100.00
128 Oyster Bay	36059 51898	0.280384	0.280384	100.00
129 Oyster Bay	36059 51901	0.083810	0.083810	100.00
130 Oyster Bay	36059 51902	0.075176	0.075176	100.00
131 Oyster Bay	36059 51903	0.100350	0.100350	100.00
132 Oyster Bay	36059 51904	0.105560	0.105560	100.00
133 Oyster Bay	36059 51905	0.210141	0.210141	100.00
134 Oyster Bay	36059 51906	0.179966	0.179966	100.00
135 Oyster Bay	36059 51907	0.140507	0.140507	100.00
136 Oyster Bay	36059 51911	0.103650	0.103650	100.00
137 Oyster Bay	36059 51912	0.097865	0.097865	100.00
138 Oyster Bay	36059 51913	0.082822	0.082822	100.00
139 Oyster Bay	36059 51914	0.079581	0.079581	100.00
140 Oyster Bay	36059 51915	0.135434	0.135434	100.00
141 Oyster Bay	36059 51916	0.175401	0.175401	100.00
142 Oyster Bay	36059 51917	0.109152	0.109152	100.00
143 Oyster Bay	36059 51921	0.153339	0.153339	100.00
144 Oyster Bay	36059 51922	0.097000	0.097000	100.00
145 Oyster Bay	36059 51923	0.093232	0.093232	100.00
146 Oyster Bay	36059 51924	0.115787	0.115787	100.00
147 Oyster Bay	36059 51925	0.097220	0.097220	100.00
148 Oyster Bay	36059 51926	0.119552	0.119552	100.00
149 Oyster Bay	36059 51927	0.095958	0.095958	100.00
150 Oyster Bay	36059 51931	0.243480	0.243480	100.00
151 Oyster Bay	36059 51932	0.098813	0.098813	100.00
152 Oyster Bay	36059 51933	0.147262	0.147262	100.00
154 Oyster Bay	36059 51935	0.381956	0.381956	100.00
155 Oyster Bay	36059 51936	0.117441	0.117441	100.00
156 Oyster Bay	36059 51941	0.142372	0.142372	100.00
157 Oyster Bay	36059 51942	0.134401	0.134401	100.00
158 Oyster Bay	36059 51943	0.083054	0.083054	100.00
159 Oyster Bay	36059 51944	0.069508	0.069508	100.00
160 Oyster Bay	36059 51945	0.052337	0.052337	100.00
161 Oyster Bay	36059 51951	0.158513	0.158513	100.00
162 Oyster Bay	36059 51952	0.167513	0.167513	100.00
163 Oyster Bay	36059 51953	0.080802	0.080802	100.00
164 Oyster Bay	36059 51954	0.061858	0.061858	100.00
165 Oyster Bay	36059 51955	0.041086	0.041086	100.00
166 Oyster Bay	36059 51956	0.069092	0.069092	100.00
167 Oyster Bay	36059 51957	0.190807	0.190807	100.00
168 Oyster Bay	36059 51991	0.175409	0.175409	100.00

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169 Oyster Bay	36059 51992	0.141501	0.141501	100.00
170 Oyster Bay	36059 51993	0.241770	0.241770	100.00
171 Oyster Bay	36059 51994	0.113201	0.113201	100.00
172 Oyster Bay	36059 51995	0.139898	0.139898	100.00
173 Oyster Bay	36059 52011	2.987085	1.834280	61.41
174 Oyster Bay	36059 52012	0.195238	0.195238	100.00
175 Oyster Bay	36059 52013	0.115091	0.115091	100.00
176 Oyster Bay	36059 52014	0.139730	0.139730	100.00
177 Oyster Bay	36059 52015	0.480532	0.339125	70.57
179 Oyster Bay	36059 52021	0.197382	0.196910	99.76
180 Oyster Bay	36059 52022	0.086460	0.086460	100.00
181 Oyster Bay	36059 52023	0.104830	0.104830	100.00
182 Oyster Bay	36059 52024	0.156316	0.156316	100.00
183 Oyster Bay	36059 52031	0.129270	0.008956	6.93
185 Oyster Bay	36059 52033	0.066072	0.028801	43.59
186 Oyster Bay	36059 52034	0.189521	0.066988	35.35
187 Oyster Bay	36059 52035	0.146510	0.090532	61.79
188 Oyster Bay	36059 52036	0.145339	0.135561	93.27
202 North Hempstead	36059 3042011	0.089801	0.001317	1.47
203 North Hempstead	36059 3042012	0.134217	0.093574	69.72
204 North Hempstead	36059 3042013	0.039955	0.039955	100.00
205 North Hempstead	36059 3042014	0.103017	0.063512	61.65
209 North Hempstead	36059 3042021	0.189944	0.167457	88.16
210 North Hempstead	36059 3042022	0.175489	0.175489	100.00
211 North Hempstead	36059 3042023	0.079550	0.065277	82.06
212 North Hempstead	36059 3042024	0.052875	0.000076	0.14
216 Hempstead	36059 4078011	0.113872	0.113872	100.00
217 Hempstead	36059 4078012	0.097152	0.097152	100.00
218 Hempstead	36059 4078013	0.129431	0.129431	100.00
219 Hempstead	36059 4078014	0.070470	0.070470	100.00
220 Hempstead	36059 4078015	0.075502	0.051530	68.25
221 Hempstead	36059 4078016	0.080126	0.004910	6.13
222 Hempstead	36059 4078017	0.200642	0.131640	65.61
223 Hempstead	36059 4078025	0.199284	0.071752	36.00
224 Oyster Bay	36059 5177013	6.105113	0.018654	0.31
228 Oyster Bay	36059 5182042	1.804216	0.155289	8.61
229 Oyster Bay	36059 5182043	0.576702	0.057829	10.03
230 Oyster Bay	36059 5185011	1.314818	0.451413	34.33
231 Oyster Bay	36059 5185012	0.378417	0.371762	98.24
232 Oyster Bay	36059 5185013	0.625477	0.320179	51.19
233 Oyster Bay	36059 5185021	0.225955	0.225955	100.00
234 Oyster Bay	36059 5185022	0.125010	0.125010	100.00
235 Oyster Bay	36059 5185023	0.090640	0.090640	100.00
236 Oyster Bay	36059 5196011	0.305378	0.305378	100.00
237 Oyster Bay	36059 5196012	0.075174	0.075174	100.00
238 Oyster Bay	36059 5196013	0.069034	0.069034	100.00
239 Oyster Bay	36059 5196014	0.121266	0.121266	100.00
240 Oyster Bay	36059 5196021	0.125211	0.125211	100.00
241 Oyster Bay	36059 5196022	0.115313	0.115313	100.00
242 Oyster Bay	36059 5196023	0.125271	0.125271	100.00
243 Oyster Bay	36059 5197021	1.405407	0.263395	18.74
244 Oyster Bay	36059 5197022	0.501175	0.375155	74.86
245 Oyster Bay	36059 5197023	0.129265	0.129265	100.00
246 Oyster Bay	36059 5197024	0.232318	0.160101	68.91
247 Oyster Bay	36059 5197031	0.168414	0.168414	100.00
248 Oyster Bay	36059 5197032	0.156403	0.156403	100.00
249 Oyster Bay	36059 5197033	0.261772	0.261772	100.00
250 Oyster Bay	36059 5197041	0.192907	0.192907	100.00
251 Oyster Bay	36059 5197042	0.196319	0.196319	100.00
252 Oyster Bay	36059 5197043	0.163440	0.163440	100.00
253 Oyster Bay	36059 5198011	0.063938	0.063938	100.00

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254	Oyster Bay	36059	5198012	0.058995	0.058995	100.00
255	Oyster Bay	36059	5198013	0.122525	0.122525	100.00
256	Oyster Bay	36059	5198014	0.081924	0.081924	100.00
257	Oyster Bay	36059	5198021	0.185268	0.185268	100.00
258	Oyster Bay	36059	5198022	0.195700	0.195700	100.00
259	Oyster Bay	36059	5198023	0.224770	0.224770	100.00
260	Oyster Bay	36059	5198024	0.212027	0.212027	100.00
261	Oyster Bay	36059	5200011	0.526965	0.526965	100.00
262	Oyster Bay	36059	5200012	0.099471	0.099471	100.00
263	Oyster Bay	36059	5200013	0.140007	0.140007	100.00
264	Oyster Bay	36059	5200014	0.099714	0.099714	100.00
265	Oyster Bay	36059	5200015	0.219560	0.219560	100.00
266	Oyster Bay	36059	5200019	0.593226	0.593226	100.00
267	Oyster Bay	36059	5200021	0.528013	0.528013	100.00
268	Oyster Bay	36059	5200022	0.262306	0.262306	100.00
269	Oyster Bay	36059	5200023	0.100961	0.100961	100.00
270	Oyster Bay	36059	5200024	0.170939	0.170939	100.00
274	Oyster Bay	36059	5204016	0.182374	0.083699	45.89
282	Oyster Bay	36059	5205014	0.146155	0.008462	5.79
290	Oyster Bay	36059	51934	0.333448	0.333448	100.00

Totals:

45.087914

28.202173

For Radius of 2 Mi., Circle Area = 12.566371

No.	City	Block Group ID	Total Area	Partial Area	% Within Radius
35	Hempstead	36059 40861	0.070682	0.068267	96.58
36	Hempstead	36059 40862	0.080089	0.050144	62.61
37	Hempstead	36059 40863	0.060201	0.011509	19.12
40	Hempstead	36059 40866	0.147746	0.006449	4.36
41	Hempstead	36059 40871	0.076625	0.076625	100.00
42	Hempstead	36059 40872	0.091785	0.091785	100.00
43	Hempstead	36059 40873	0.084517	0.084517	100.00
44	Hempstead	36059 40874	0.071589	0.071589	100.00
45	Hempstead	36059 40875	0.124207	0.103590	83.40
46	Hempstead	36059 40876	0.077009	0.025161	32.67
47	Hempstead	36059 40881	0.089193	0.088432	99.15
48	Hempstead	36059 40882	0.131833	0.131833	100.00
49	Hempstead	36059 40883	0.109558	0.109558	100.00
50	Hempstead	36059 40884	0.113519	0.113519	100.00
51	Hempstead	36059 40885	0.097564	0.097564	100.00
52	Hempstead	36059 40886	0.136047	0.136047	100.00
53	Hempstead	36059 40887	0.077172	0.077172	100.00
54	Hempstead	36059 40888	0.076288	0.076288	100.00
55	Hempstead	36059 40891	0.136360	0.016561	12.15
61	Hempstead	36059 40901	0.075644	0.006224	8.23
65	Hempstead	36059 40905	0.239702	0.050503	21.07
66	Hempstead	36059 40906	0.064386	0.043574	67.68
120	Oyster Bay	36059 51883	0.161841	0.042650	26.35
121	Oyster Bay	36059 51891	0.081308	0.079398	97.65
122	Oyster Bay	36059 51892	0.227791	0.227791	100.00
123	Oyster Bay	36059 51893	0.085302	0.084445	99.00
124	Oyster Bay	36059 51894	0.073325	0.041727	56.91
125	Oyster Bay	36059 51895	0.499899	0.018098	3.62
126	Oyster Bay	36059 51896	0.275932	0.118560	42.97
127	Oyster Bay	36059 51897	0.089817	0.089817	100.00
128	Oyster Bay	36059 51898	0.280384	0.249208	88.88

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129 Oyster Bay	36059 51901	0.083810	0.083810	100.00
130 Oyster Bay	36059 51902	0.075176	0.075176	100.00
131 Oyster Bay	36059 51903	0.100350	0.100350	100.00
132 Oyster Bay	36059 51904	0.105560	0.070723	67.00
133 Oyster Bay	36059 51905	0.210141	0.206067	98.06
134 Oyster Bay	36059 51906	0.179966	0.019118	10.62
135 Oyster Bay	36059 51907	0.140507	0.001875	1.33
136 Oyster Bay	36059 51911	0.103650	0.103650	100.00
137 Oyster Bay	36059 51912	0.097865	0.097865	100.00
138 Oyster Bay	36059 51913	0.082822	0.082822	100.00
139 Oyster Bay	36059 51914	0.079581	0.079581	100.00
140 Oyster Bay	36059 51915	0.135434	0.135434	100.00
141 Oyster Bay	36059 51916	0.175401	0.175401	100.00
142 Oyster Bay	36059 51917	0.109152	0.109152	100.00
143 Oyster Bay	36059 51921	0.153339	0.153339	100.00
144 Oyster Bay	36059 51922	0.097000	0.097000	100.00
145 Oyster Bay	36059 51923	0.093232	0.093232	100.00
146 Oyster Bay	36059 51924	0.115787	0.115787	100.00
147 Oyster Bay	36059 51925	0.097220	0.097220	100.00
148 Oyster Bay	36059 51926	0.119552	0.119552	100.00
149 Oyster Bay	36059 51927	0.095958	0.095958	100.00
150 Oyster Bay	36059 51931	0.243480	0.243480	100.00
151 Oyster Bay	36059 51932	0.098813	0.098813	100.00
152 Oyster Bay	36059 51933	0.147262	0.147262	100.00
154 Oyster Bay	36059 51935	0.381956	0.381956	100.00
155 Oyster Bay	36059 51936	0.117441	0.117441	100.00
156 Oyster Bay	36059 51941	0.142372	0.142372	100.00
157 Oyster Bay	36059 51942	0.134401	0.134401	100.00
158 Oyster Bay	36059 51943	0.083054	0.083054	100.00
159 Oyster Bay	36059 51944	0.069508	0.069508	100.00
160 Oyster Bay	36059 51945	0.052337	0.052337	100.00
161 Oyster Bay	36059 51951	0.158513	0.031095	19.62
162 Oyster Bay	36059 51952	0.167513	0.164901	98.44
163 Oyster Bay	36059 51953	0.080802	0.080802	100.00
164 Oyster Bay	36059 51954	0.061858	0.061858	100.00
165 Oyster Bay	36059 51955	0.041086	0.041086	100.00
166 Oyster Bay	36059 51956	0.069092	0.069092	100.00
167 Oyster Bay	36059 51957	0.190807	0.180660	94.68
168 Oyster Bay	36059 51991	0.175409	0.175409	100.00
169 Oyster Bay	36059 51992	0.141501	0.141501	100.00
170 Oyster Bay	36059 51993	0.241770	0.241770	100.00
171 Oyster Bay	36059 51994	0.113201	0.113201	100.00
172 Oyster Bay	36059 51995	0.139898	0.139898	100.00
173 Oyster Bay	36059 52011	2.987085	0.159466	5.34
175 Oyster Bay	36059 52013	0.115091	0.026461	22.99
233 Oyster Bay	36059 5185021	0.225955	0.157323	69.63
234 Oyster Bay	36059 5185022	0.125010	0.115901	92.71
235 Oyster Bay	36059 5185023	0.090640	0.028036	30.93
236 Oyster Bay	36059 5196011	0.305378	0.305378	100.00
237 Oyster Bay	36059 5196012	0.075174	0.075174	100.00
238 Oyster Bay	36059 5196013	0.069034	0.069034	100.00
239 Oyster Bay	36059 5196014	0.121266	0.121266	100.00
240 Oyster Bay	36059 5196021	0.125211	0.125211	100.00
241 Oyster Bay	36059 5196022	0.115313	0.115313	100.00
242 Oyster Bay	36059 5196023	0.125271	0.125271	100.00
248 Oyster Bay	36059 5197032	0.156403	0.117588	75.18
249 Oyster Bay	36059 5197033	0.261772	0.040346	15.41
251 Oyster Bay	36059 5197042	0.196319	0.031231	15.91
252 Oyster Bay	36059 5197043	0.163440	0.110000	67.30
253 Oyster Bay	36059 5198011	0.063938	0.063938	100.00
254 Oyster Bay	36059 5198012	0.058995	0.058995	100.00

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255 Oyster Bay	36059 5198013	0.122525	0.122525	100.00
256 Oyster Bay	36059 5198014	0.081924	0.081924	100.00
258 Oyster Bay	36059 5198022	0.195700	0.123069	62.89
259 Oyster Bay	36059 5198023	0.224770	0.187000	83.20
260 Oyster Bay	36059 5198024	0.212027	0.144287	68.05
261 Oyster Bay	36059 5200011	0.526965	0.526965	100.00
262 Oyster Bay	36059 5200012	0.099471	0.099471	100.00
263 Oyster Bay	36059 5200013	0.140007	0.140007	100.00
264 Oyster Bay	36059 5200014	0.099714	0.099669	99.95
265 Oyster Bay	36059 5200015	0.219560	0.131446	59.87
266 Oyster Bay	36059 5200019	0.593226	0.593226	100.00
267 Oyster Bay	36059 5200021	0.528013	0.235645	44.63
268 Oyster Bay	36059 5200022	0.262306	0.127128	48.47
269 Oyster Bay	36059 5200023	0.100961	0.030692	30.40
270 Oyster Bay	36059 5200024	0.170939	0.170939	100.00
290 Oyster Bay	36059 51934	0.333448	0.333448	100.00
Totals:		18.803741	12.506989	

For Radius of 1 Mi., Circle Area = 3.141593

No.	City	Block Group ID	Total Area	Partial Area	% Within Radius
136 Oyster Bay	36059 51911	0.103650	0.079590	76.79	
137 Oyster Bay	36059 51912	0.097865	0.018336	18.74	
143 Oyster Bay	36059 51921	0.153339	0.153339	100.00	
144 Oyster Bay	36059 51922	0.097000	0.097000	100.00	
145 Oyster Bay	36059 51923	0.093232	0.093232	100.00	
146 Oyster Bay	36059 51924	0.115787	0.087569	75.63	
147 Oyster Bay	36059 51925	0.097220	0.012338	12.69	
148 Oyster Bay	36059 51926	0.119552	0.113346	94.81	
149 Oyster Bay	36059 51927	0.095958	0.095958	100.00	
152 Oyster Bay	36059 51933	0.147262	0.141137	95.84	
154 Oyster Bay	36059 51935	0.381956	0.379023	99.23	
155 Oyster Bay	36059 51936	0.117441	0.033063	28.15	
156 Oyster Bay	36059 51941	0.142372	0.016875	11.85	
157 Oyster Bay	36059 51942	0.134401	0.117584	87.49	
158 Oyster Bay	36059 51943	0.083054	0.048962	58.95	
159 Oyster Bay	36059 51944	0.069508	0.069508	100.00	
160 Oyster Bay	36059 51945	0.052337	0.030516	58.31	
169 Oyster Bay	36059 51992	0.141501	0.000653	0.46	
170 Oyster Bay	36059 51993	0.241770	0.029667	12.27	
171 Oyster Bay	36059 51994	0.113201	0.113068	99.88	
172 Oyster Bay	36059 51995	0.139898	0.132773	94.91	
238 Oyster Bay	36059 5196013	0.069034	0.000578	0.84	
239 Oyster Bay	36059 5196014	0.121266	0.078671	64.87	
255 Oyster Bay	36059 5198013	0.122525	0.045580	37.20	
256 Oyster Bay	36059 5198014	0.081924	0.081924	100.00	
261 Oyster Bay	36059 5200011	0.526965	0.467901	88.79	
262 Oyster Bay	36059 5200012	0.099471	0.022612	22.73	
263 Oyster Bay	36059 5200013	0.140007	0.002362	1.69	
266 Oyster Bay	36059 5200019	0.593226	0.245005	41.30	
290 Oyster Bay	36059 51934	0.333448	0.333448	100.00	
Totals:		4.826171	3.141618		

Servo Corp of America
Hicksville, NY

For Radius of .5 Mi., Circle Area = 0.785398

No.	City	Block Group ID	Total Area	Partial Area	% Within Radius
143	Oyster Bay	36059 51921	0.153339	0.007990	5.21
144	Oyster Bay	36059 51922	0.097000	0.039063	40.27
145	Oyster Bay	36059 51923	0.093232	0.024093	25.84
149	Oyster Bay	36059 51927	0.095958	0.000957	1.00
154	Oyster Bay	36059 51935	0.381956	0.093500	24.48
172	Oyster Bay	36059 51995	0.139898	0.017342	12.40
261	Oyster Bay	36059 5200011	0.526965	0.135110	25.64
266	Oyster Bay	36059 5200019	0.593226	0.004371	0.74
290	Oyster Bay	36059 51934	0.333448	0.101406	30.41
Totals:			2.415023	0.423832	

For Radius of .25 Mi., Circle Area = 0.196350

No.	City	Block Group ID	Total Area	Partial Area	% Within Radius
154	Oyster Bay	36059 51935	0.381956	0.072976	19.11
290	Oyster Bay	36059 51934	0.333448	0.123373	37.00
Totals:			0.715404	0.196350	

=====
Site Data
=====

Population: 245177.20
Households: 79285.80
Drilled Wells: 25.00
Dug Wells: 124.34
Other Water Sources: 110.51

=====
Partial (RING) data
=====

----- Within Ring: 4 Mile(s) and 3 Mile(s) -----

Population: 90597.00 90600
Households: 29013.53
Drilled Wells: 5.40
Dug Wells: 29.91
Other Water Sources: 20.21

** Population On Private Wells: 110.25

----- Within Ring: 3 Mile(s) and 2 Mile(s) -----

Population: 76557.91 76560
Households: 24579.42
Drilled Wells: 12.60
Dug Wells: 41.43
Other Water Sources: 44.27

** Population On Private Wells: 168.29

----- Within Ring: 2 Mile(s) and 1 Mile(s) -----

Population: 61601.28 61600
Households: 20228.19
Drilled Wells: 6.94
Dug Wells: 21.24
Other Water Sources: 43.67

** Population On Private Wells: 85.83

----- Within Ring: 1 Mile(s) and .5 Mile(s) -----

Population: 15018.39 15020
Households: 5003.30
Drilled Wells: 0.06
Dug Wells: 27.53
Other Water Sources: 2.36

** Population On Private Wells: 82.80

----- Within Ring: .5 Mile(s) and .25 Mile(s) -----

Population:	827.49	830
Households:	270.08	
Drilled Wells:	0.00	
Dug Wells:	0.98	
Other Water Sources:	0.00	

** Population On Private Wells: 3.01

----- Within Ring: .25 Mile(s) and 0 Mile(s) -----

Population:	575.13	580
Households:	191.28	
Drilled Wells:	0.00	
Dug Wells:	3.25	
Other Water Sources:	0.00	

** Population On Private Wells: 9.77

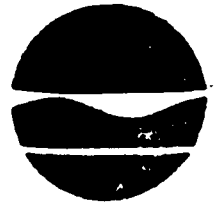
** Total Population On Private Wells: 459.95

REFERENCE NO. 22

New York State Department of Environmental Conservation
Building 40—SUNY, Stony Brook, New York 11794

(516) 751-7900

VN ~~ML~~ RW/HA



Thomas C. Jorling
Commissioner

February 17, 1988

Servo Corp. of America
111 New South Rd.
Hicksville, N.Y. 11802

Re: Deletion of SPDES NY-0076252
UPA #10-88-0209

Dear Sir/Madam:

This Department has made a determination to delete your referenced SPDES permit because your non-contact cooling water discharge has been sampled by the Nassau County Health Department and found to be uncontaminated.

You are also hereby notified that it shall be unlawful for any person to cause a discharge of pollutants from this facility to either surface or ground waters unless a permit to do so has been issued by this Department and if applicable, any subsequent owner(s) of this facility should be advised of the requirement to obtain a permit if they intend to cause such a discharge.

Please direct any inquiries you may have to this office or call (516) 751-7900, extension 239.

Very truly yours,

David DeRidder

David DeRidder
Deputy Regional Permit Administrator

DDR/KHM:jf
cc: R. Hannaford
P. Barbato
file
✓ S. Juczak
T. Sanford